

# The CACNews

News of the California Association of Criminalists • Third Quarter 2013



# The President's Desk

## The View from the Other Side

It seems very trite to begin an article as the head of an organization with a bunch of thank-yous. They always seem to begin that way, don't they? The person is so very gratified to be in this position of leadership. And it is invariably a tremendous honor to be the head of such a prestigious organization. Then the excruciating list of thank-yous begins and, in the most egregious cases, it will extend all the way down to their mailman and the guy who repaints the house numbers on the sidewalk. I've read these types of articles many times and I've always thought them to be unnecessary and, frankly, a little insincere. I have often felt the desire to suggest to the author, "Have something to say! Nobody wants to read thank-yous except the people being thanked!"

But as with many things in life, the view looks a lot different from the other side. The fact of the matter is that I am incredibly gratified to be the president of the California Association of Criminalists. And it is perhaps the highest honor of my life to be the head of such a prestigious organization. And although I have no idea what my mailman is named or who paints the house numbers on the sidewalk, there are those to whom I want to offer my thanks. However, I promise to keep that list short and the fact that I ran for president unopposed will make that promise significantly easier to keep. And after the thanks-yous are done, I intend to say something substantive, so stay tuned.

Our collective thanks must first be offered to Immediate Past President Todd Weller. Like myself, he joined the CAC Board of Directors as president-elect without first having served on the board in any other position. After one year, he became president and represented our association with all the professionalism and class of any one of his predecessors. He accomplished much during his year as president that will benefit the CAC for many years to come and we owe him our gratitude.

Next, I would like to thank Dr. Kathy Roberts and the School of Criminal Justice and Criminalistics at California State University, Los Angeles for hosting a truly excellent Spring seminar. So much work goes into planning a successful seminar, but Dr. Roberts and her staffs' flawless execution made it look stress-free. For the first time ever, seminar registration was done exclusively online. As a result, there was no need to deposit checks or enter registration data manually, drastically reducing the demands on our entirely volunteer organization. I was particularly encouraged to see so much participation from the CSULA students, not only through their service on the seminar staff, but also with respect to the technical program and posters. It served as a reminder to me that the CAC's incredible support of the students of criminalistics can only result in the improvement of our field. The students of today are indeed the forensic scientists of tomorrow and it is only by supporting these students that the CAC can continue to grow itself while successfully fulfilling its mission of fostering education and driving the improvement of criminalistics in our state.

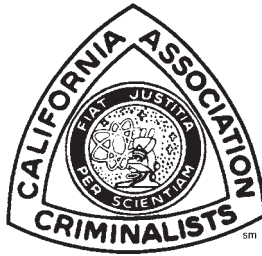
*please turn to page 4*

**I acknowledge the existence of the pressure that most laboratory management experiences from every direction to complete more work with fewer people. I get it. In fact I've experienced the trickle-down effect of that pressure.**



**Eric Halsing**  
*CAC President*

THIRD QUARTER 2013



**Editorial Secretary** Greg Matheson  
editor@cacnews.org

**Art Director** John Houde/Calico Press, LLC  
(206) 855-1903  
john@calicopress.com

**Webmasters** Mark Traughber, Eric Halsing  
(951) 361-5000  
webmaster@cacnews.org

**Advertising** Contact the Editor

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The deadlines for submissions are: December 1, March 1, June 1 and August 15.



## On the cover...

The unofficial symbol of the CAC presidency: The ancient and most noble "coconut." More photos on page 34.

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Lastly, I want to thank the managers and supervisors of each of the laboratories that allowed members of their technical staff to attend the seminar. I acknowledge the existence of the pressure that most laboratory management experiences from every direction to complete more work with fewer people. I get it. In fact I've experienced the trickle-down effect of that pressure. It is a reality with which everyone has to cope. Therefore, the management who nevertheless allow their staff to continue to learn by attending seminars such as ours, who perceive correctly that a criminalist that does not interact with his or her fellow scientists ceases to hone and develop their base of knowledge, are deserving of an even greater thanks during these times of restricted budgets. We are working in a time when you need a form to be approved by three people just to have permission to submit a request to complete the next form. Without the support of these dedicated management teams, the CAC could not accomplish its goals and, consequently, the quality of criminalistics in California would not be nearly as excellent as it is.

Now having said all that, there is a contrasting lack of involvement with the CAC from other management teams that I feel a need to point out. In the Fourth Quarter, 2012 issue of the *CACNews*, our editorial secretary, Greg Matheson, mentioned in his "Editor's Desk" column that he has "seen many criminalists get promoted to a supervision and/or management position, join the CACLD, and then let their CAC membership lapse." Too true. Indeed, looking around the room at the Pasadena seminar, it was clear that the overwhelming majority of

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### Now having said all that, there is a contrasting lack of involvement with the CAC from other management teams that I feel a need to point out.

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the attendees were journeyman level criminalists and student members. But I have personal knowledge of other, much less convincing, reasons as to why so many of our peers in supervisory roles let their CAC membership lapse. For example, at least three supervisors have told me in the past that they are no longer members because their agency ceased paying their dues, so they canceled their membership "in protest." Now, if you're like me, you can rarely think of good comebacks on the spot. Much like *Seinfeld's* George Costanza, I mostly come up with very cogent counter-arguments weeks later. But if I had it to do over, I would have asked those supervisors one question: "Who are you really hurting?" Certainly not their agencies; their employer clearly doesn't view membership in a professional organization as worthwhile. Consequently, the teeth of their "protest" bite only themselves and the CAC membership, not the agency against which they are protesting. Additionally, they are hurting their peers and the students who would collectively benefit both from exposure to these accomplished scientists and from the increased financial assistance that a larger CAC membership base affords. Recently another supervisor, one for whom I have great respect, told me that he's "just cheap" and doesn't want to pay the annual \$80. Well, okay. While I disagree with the end result of his cost/benefit analysis, I appreciate the honesty. And I have heard other reasons given as well. But I have yet to hear one that recommends itself in any convincing way.

This absence of a large portion of our supervisors and managers is at once saddening and maddening. Personally, I

have always enjoyed hearing presentations from these individuals, be they case reports, issues they have faced at their laboratories, historical perspectives, or any other topic. The three supervisors I mentioned above who canceled their memberships in protest have such a wealth of knowledge and experience to offer us less-seasoned criminalists that I feel profoundly cheated. I wholeheartedly feel they are missing out—but we members are definitely missing out on them as well. Simply put, the CAC suffers a reduction in quality without their contributions. Therefore, I propose to you that we do our utmost to bring these incredibly valuable members of our profession back into the fold. Let us enjoin upon them the benefits of keeping professional relationships with fellow experts in their field strong while staying current with the technical knowledge they are expected to possess. Whenever possible, we should remind them how much fun they can have and how rewarding being a forensic scientist can be when they aren't trapped behind a desk writing grants or completing performance evaluations. With the increased distance from the bench that a supervisory role carries with it, I think it would be easy to slowly lose the passion and enthusiasm for criminalistics that management likely had at the outset of their careers. I believe it is up to us to remind them.



## CACBits

### CAC Awards Announced

The CAC Awards Committee, Vincent Villena and Wanwalai Charoenchote, announce that the winner of the Edward F. Rhodes Memorial Award is Mo Choi. (left)



The winner of the 2012 Paul Kirk Presidents Award is Philip Hess.

The winner of the Alfred A. Biasotti Most Outstanding Presentation Award is Eric Halsing for his paper, "The Witness Execution of Tong Van Le."

The W. Jack Cadman Award goes to Carolyn Gannett.

Service Awards are presented to Pasadena Seminar chairs Katherine Roberts and Donald Johnson and also to Carolyn Gannett for her work

on the Ethics Committee, Kristin Beyers for work on the Financial Review Committee, outgoing Treasurer Laura Silva and Regional Director North, Meghan Mannion-Gray. A Certificate of Appreciation was given to Deputy Cary Colla (recommended by Jean Arase of Santa Clara County.)

# The Editor's Desk

## Exploring the Value of Investigating Sentinel Events

There is no question the National Institute of Justice (NIJ) has provided a valuable service to the forensic science community over the last several years. The grants they provided, the research they funded and the projects they supported have moved forensic science forward in a way that would not have been possible without their support. In particular, the LAPD DNA program would not be as well equipped without NIJ DNA Capacity Building support. Many labs would not have the personnel to complete more casework or have the ability to validate new technologies without these funds. Though over the last several years their most obvious and visible funding for forensic science has been in the area of DNA, there have been many other projects that have benefitted our community.

In late May I had the honor to be invited to participate in one of those other non-DNA projects. The initial funding was used to bring a group of people together in Washington DC to participate in the NIJ's Sentinel Event Initiative Roundtable. NIJ described the roundtable event as bringing together "a very select (about 20 people) group to help us think about a larger research effort to develop processes through which jurisdictions could review errors (such as a wrongful conviction) that might signal (hence, "sentinel" event) underlying system weaknesses." The ultimate goal by NIJ was the "exploration of developing an all-stakeholder, non-blaming, forward-looking model based on successful efforts in aviation, industry and medicine."

As I said, when I received the invitation to participate I was honored and looked forward to providing the perspective of the forensic science community. The problem was, I wasn't sure what a sentinel event was. Thanks to the Internet and background reading we were assigned to complete before the roundtable the concept of a sentinel event became clear. I felt vindicated in my ignorance when at the meeting easily one third of the group confessed they had not heard the term before, and all of them had considerably more initials after their name than me.

A Sentinel Event is defined by The Joint Commission (TJC) as any unanticipated event in a healthcare setting resulting in death or serious physical or psychological injury to a patient or patients, not related to the natural course of the patient's illness. Sentinel events specifically include loss of a limb or gross motor function, and any event for which a recurrence would carry a risk of a serious adverse outcome. Sentinel events are identified under TJC accreditation policies to help aid in root cause analysis and to assist in development of preventative measures. The Joint Commission tracks events in a database to ensure events are adequately analyzed and undesirable trends or decreases in performance are caught early and mitigated. The Joint Commission is an independent, not-for-profit organization, The Joint Commission accredits and certifies more than 20,000 health care organizations and programs in the United States. Joint Commission accreditation and certification is recognized nationwide as a symbol of quality that reflects an organization's commitment to meeting certain performance standards.

Another definition is that a sentinel event is an unexpected occurrence involving death or serious physical or psychological injury, or the risk thereof. Serious injury specifically includes loss of limb or function. The phrase, "or the risk thereof" includes any process variation for which a recurrence would carry a significant chance of a serious adverse outcome. Such events are called "sentinel" because they signal the need for immediate investigation and response.

When I was provided with a list of the other 19 attendees I was dismayed to see I was the only representative from the forensic science community. The other participants were; a former supreme court justice, a superior court judge, five professors,

*cont'd on next page*

**The more I listened to the discussion, the more I became comfortable with the idea of a system-wide review. I believe it would work to our advantage as forensic scientists. The easiest events to focus on for the initial stages of this process are wrongful convictions.**



**Greg Matheson**  
CAC Editorial Secretary

a district attorney, the executive director of the Innocence Project, a deputy sheriff, several former law enforcement officials currently overseeing law enforcement organizations, a defense attorney and a victim advocate.

As our discussion commenced and our direction was better defined it became clear why the participants of the roundtable were selected. The issue we were tasked with discussing was how the criminal justice system as a whole could deal with significant events (sentinel events) such as a wrongful conviction. The desire was to open a dialogue with all the participants in the system to see if something can be learned when the system fails. When looking at it from this broad view the composition of the group made sense. Though we might not like to admit it, forensic science is just one small (but important) piece of the whole system. Also present were knowledgeable representatives of the medical and aviation industries, two very different professions that have systems in place or are establishing systems to deal their own sentinel events such as an airplane crash or a surgical death.

The more I listened to the discussion, the more I became comfortable with the idea of a system-wide review. I believe it would work to our advantage as forensic scientists. The easiest events to focus on for the initial stages of this process are wrongful convictions. They are obvious and significant failures of the criminal justice system. At present, the only, or at least most vocal, group tracking wrongful convictions is the Innocence Project. The system used to classify the source of wrongful convictions used by the Innocence Project appears to be simplistic focusing on the first event in a sequence of system failures and assigning "blame" for the failure to the profession creating the first event. Collectively, forensic scientists have bristled at the high number of wrongful convictions assigned to forensic science. We must acknowledge forensic scientists have contributed to several of the confirmed wrongful convictions, but many of these would not have resulted in a conviction if several other participants in the process didn't also fail at their job. It is well-documented sentinel events rarely occur due to a single failure by a single partici-

## J'accuse!

*"Picking Cotton" by Jennifer Thompson-Cannino and Ronald Cotton with Erin Torneo.*

*Book Review by Greg Matheson*

You never know where participation in a diverse group of people will lead you and who you might meet. One of the members of the Sentinel Event Roundtable I describe in my editorial was Jennifer Thompson-Cannino.

The following is the biography Jennifer provided for the event:

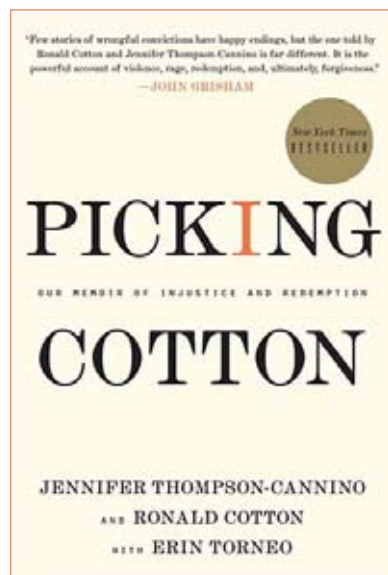
Jennifer Thompson-Cannino is an advocate for judicial reform. Her strong convictions were born of a brutal rape she suffered; it was her compelling testimony in that case that sent Ronald Cotton to prison — not once but twice — for a crime he did not commit. Cotton was eventually freed when, nearly a decade after his first conviction, he was cleared through DNA

testing. Since then, Thompson-Cannino has successfully lobbied legislators in North Carolina to change laws so that Mr. Cotton and other wrongfully convicted people could be more generously compensated for mistakes made by the criminal justice system. Thompson-Cannino has served as a member of the North Carolina Actual Innocence Commission, which instituted procedural reforms throughout the state, and she is currently a member of the advisory committee for Active Voices and the Constitution Project.

Jennifer and Ron Cotton spoke before ASCLD at one of our annual symposium several years ago. Their story was compelling and provided the audience with insight into the criminal justice system we rarely have an opportunity to view. Her participation in the Sentinel Event Roundtable was insightful and invaluable because it provided all of us with a perspective that could only be provided by someone who doesn't work in the system but lived in it for many years. During the discussion sessions and later during dinner I kept catching comments about a book related to her experience. Finally in the last couple hours of the meeting I caught the title so during the next break I purchased and downloaded *Picking Cotton* onto my Kindle.

The book is written from the viewpoints of Jennifer and Ron, each recounting their individual, then shared, experiences of their collision with the criminal justice system. The writing style makes this book an easy read; I finished it in three days. The story they tell should teach all of us the fallibility of eyewitness testimony. I am not an expert in bias and the many forms it can take. However, I am aware of research showing how having certain bits of knowledge can influence how a subjective result is determined or how a report is written. I don't know if it is possible to eliminate all bias from an analysis while still having all the information needed by a forensic science to ask the appropriate questions and complete the appropriate analysis. However, I am a strong supporter of trying to limit the effects of bias by understanding it exists and being on guard for its negative impact on an accurate analysis. By reading Jennifer and Ron's story, you will be able to put into context the value of being told by a prosecutor and/or detective they have a positive identification of a suspect by a witness and therefore it is expected the physical evidence will support the eyewitness.

List Price: \$25.95, ISBN: 0312376537, ISBN-13: 9780312376536, Pub. Date: March 2009, Publisher: St. Martin's Press.





pant. Also, some wrongful convictions attributed to forensic science, when reviewed from a system wide perspective, resulted from failures elsewhere in the system.

Nothing was formally decided by the conclusion of the roundtable except the fact that the criminal justice system would benefit from a broader review of its sentinel events and thus acquire the ability to learn from the events and hopefully limit their reoccurrence in the future. It was also generally accepted that all the participants in the criminal justice process must take responsibility for its contribution to system failures. From the police, the lab, the prosecutors, the defense, and through to the judges along with other stakeholders representing their own interests, we all must make the overriding goal of our work to seek the truth. Before you start thinking I am just extremely naïve about all parties seeking the truth in our adversarial system, I need to share this issue was also discussed and recognized as a potential speed bump in the process. However we all felt it was important to at least start from the perspective of a common goal and desire.

Finally, the most important take-away from participation in a discussion with such a diverse group is the ability to hear varying points of view and work collectively toward a common goal. I have always stressed the importance of impartiality in the work performed by forensic scientist, but I also understand we all tend to have our own feelings of us vs. them, our tribe versus those who don't understand us. However said, we all harbor biases which if not recognized gets in our way to work with those we feel "oppose" us. Interacting with a diverse cross section of the bigger criminal justice system will provide you with a broader understanding of their role in the system. In addition seeking out these types of interactions gives you the opportunity to teach them about forensic science. By interacting with diverse participants in the criminal justice system you can show them we are not cop wanna be's who support law enforcement at all costs, but rather are educated scientists who seek the truth in our analysis of physical evidence, regardless of where the results lead. Whenever possible, take the opportunity to work with the people you might think are working at cross-purposes to you. You might be surprised by how much you learn, how much you teach and how this makes you a better professional.

*John Houde*

## FEEDBACK

### "Ah-Hah" Moment

That thump you heard near the end of the CAC spring seminar was me falling off my chair. The next-to-last paper presented on the last day was by Leonie Elie, visiting with Mark Baron from England. Her paper, "Microcrystalline Test-Raman Spectroscopy..." sounded like a pretty esoteric topic, but what she revealed was truly of historic proportions to this former drug analyst.

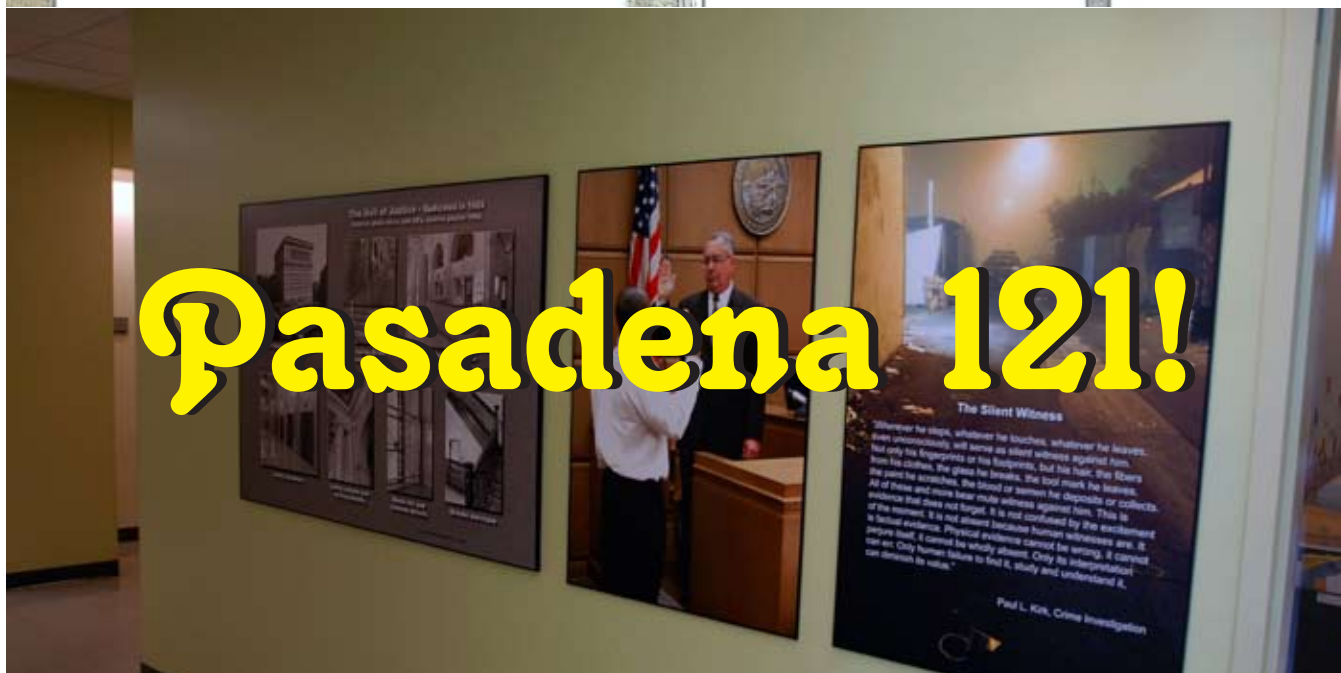
I did a lot of drugs in the 1980's... Wait, let me explain. I analyzed thousands of drug samples during my stint at the Ventura S.O. lab, and used microcrystal tests as a part of my identification protocol. When asked to explain in court how the test worked I could only restate the current thinking—it was basically a precipitation reaction leading to efficient crystal packing at the atomic level, etc. But the truth was, no one really knew *how* the test worked, they only knew *that* it worked. Microcrystals were just too, well micro, to be tested individually given the instrumentation of the day. The test was therefore empirical, having been used on thousands of compounds without a single false positive for the competent examiner. But I always felt the stern gaze of analysts in distant crime lab systems who had rejected black magic and embraced instrumentation to deduce the structure of the unknown white powdery substance.

Along comes 2013 and Leonie Elie. She managed to subject a drug microcrystal precipitated with mercuric chloride to X-ray diffraction. Voila! One of her Powerpoint slides showed a 3-D computer rendering of the result. Just as we thought: The reagent integrates with the drug molecules forming the characteristic shape that we recognize. Big deal, right? Well, actually it is. I asked her "Are you the only one in the world showing this right now?" Her "yes" was so soft it was almost inaudible. But a few of us in the audience smiled. We knew our test was reliable, and now we could prove how it worked.

—John Houde

*The 2012-13 CAC Board of Directors. Get more involved in your association by running for one of these offices.*





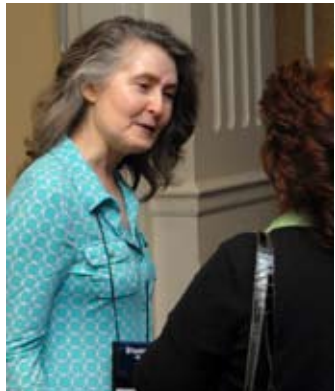
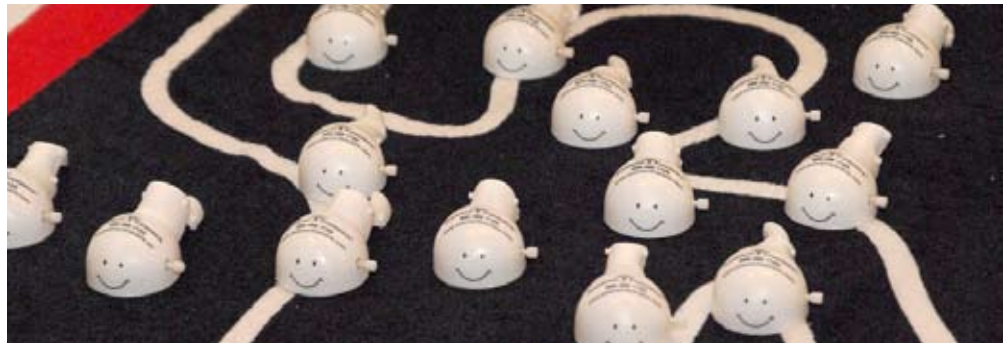
Amanda Davis gets ready for the registrants.

Pasadena was the venue for the CAC's 121st Semiannual seminar, hosted by the School of Criminal Justice and Criminalistics, CSU-LA. Seminar Chair Kathy Roberts and Co-Chair Don Johnson put on a solid meeting packed with an amazing spectrum of topics. From the most current (think Raman spectroscopy or dropout ratios or maybe the *Maryland v. King* decision) to one of the oldest technologies (microcrystal testing), this seminar had something for everyone. The "everyone" was everyone indeed, as some 225 registrants plus about 63 speakers and vendors flocked to the Hilton hotel. As a reward, they were treated to an entertaining evening of music and dancing with a performance by "Elvis" (Danny Memphis) backed by the Extrordinaires, featuring Steve Schliebe on bass guitar!





*UK visitor and CAC presenter, Leonie Elie, gazes into a bullet-recovery tank during her tour of the LASD lab.*





## Pasadena 12!



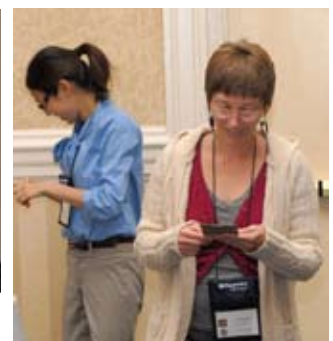
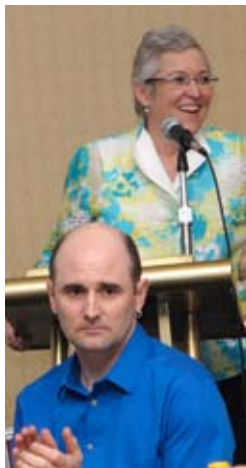
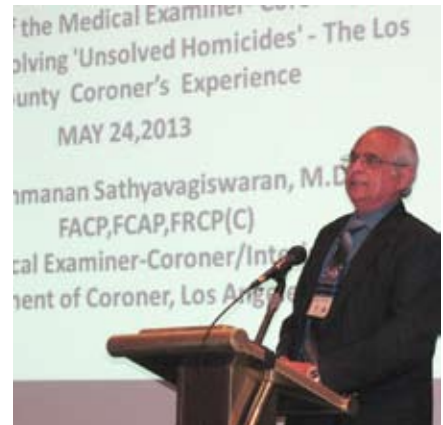




*Top: Immed. Past-Pres. Todd Weller passes the gavel to Pres. Eric Halsing. (middle, r) Seminar co-Chair Kathy Roberts moderates the Thursday morning session featuring John Song. (above) Seminar co-Chair Don Johnson meets author/speaker Joan Renner (l).*



## Pasadena 12!!



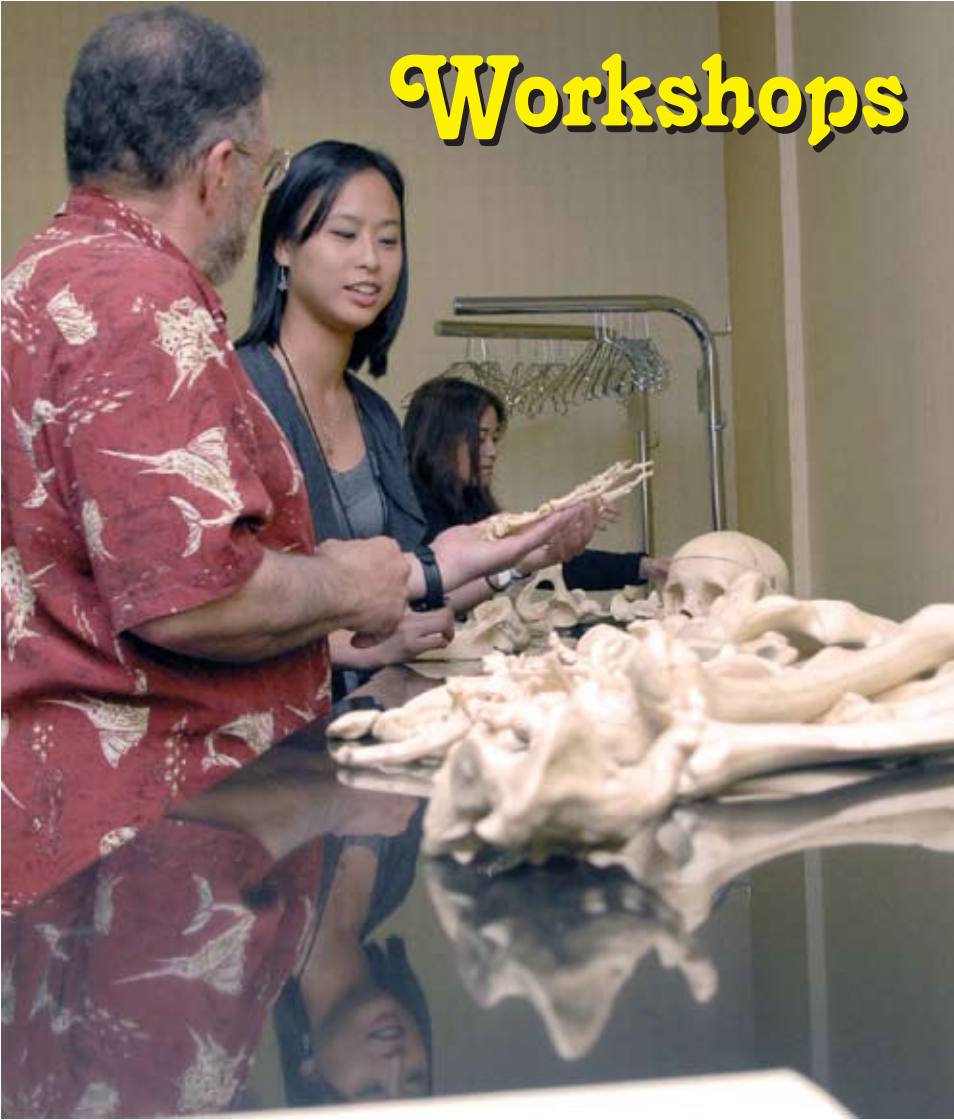


# Banquet





# Workshops



*Forensic Anthropology Co-instructors Margaret Kaleuati (above) and Elizabeth Miller (l) use lots of disarticulated skeletons in their workshop.*





Joseph L. Peterson (standing) moderates the Admissibility of Comparative Evidence workshop.



Dr. John Hellgeth from Thermo Fisher Scientific demonstrated the Nicolet iN10 FTIR Microscope System during the Spectroscopy workshop.

Courtesy Thermo Fisher



The DNA workshop (l) included a live demonstration of "Lab Retriever" software. But the workshop didn't really break for lunch as the guest speaker, LA Dep. DA Marguerite F. Rizzo presented the Maryland v. King case, only days before the U.S. Supreme Court made its ruling on DNA swabbing of arrestees.

(bottom l) Lynne Herold instructs the lecture portion of the histology workshop, "Of What We Are Made" while Don Johnson (below, r) oversees the lab.





## Workshops

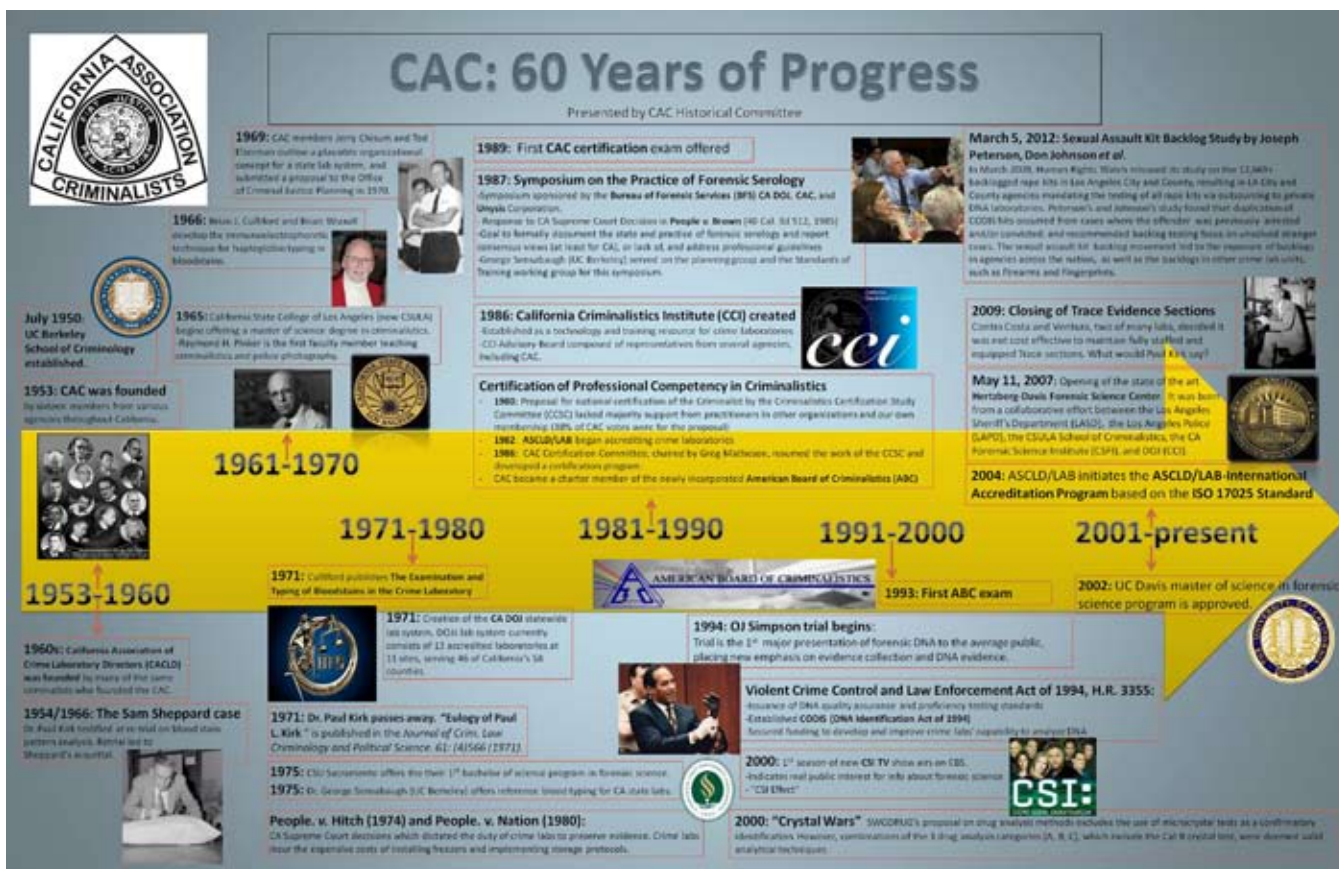
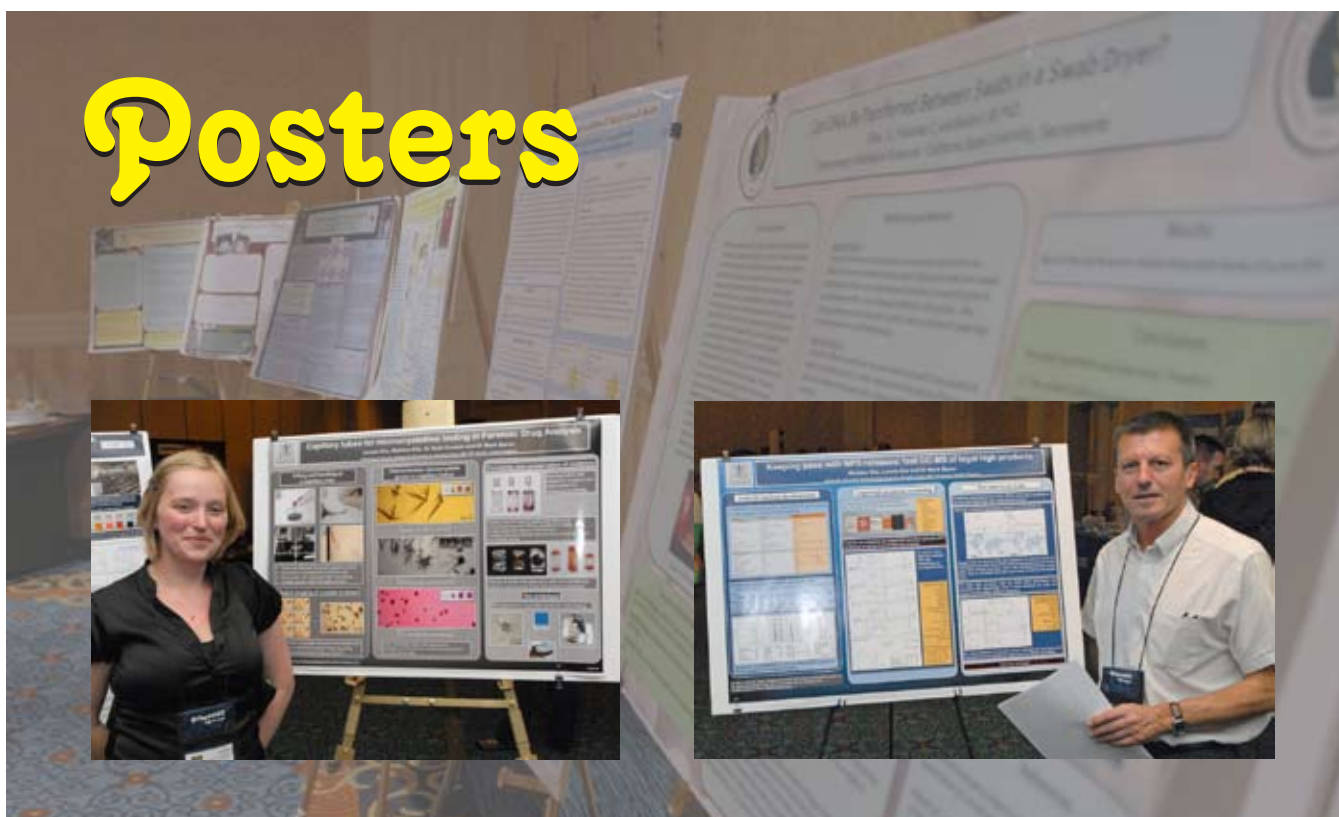


*Students in the Forensic Injury Biomechanics workshop use methods of assessing impact forces to the body and relating these forces to the likelihood of sustaining various injuries.*





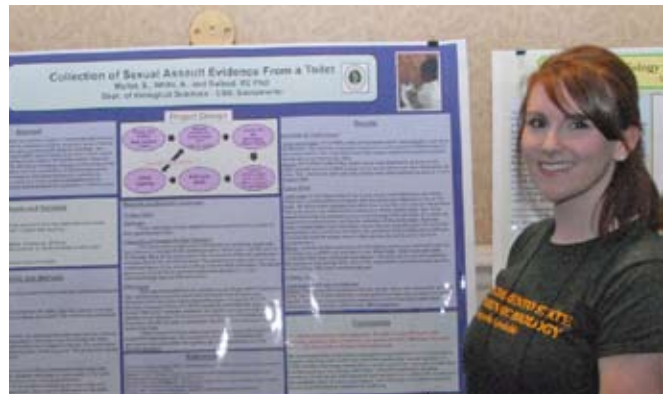
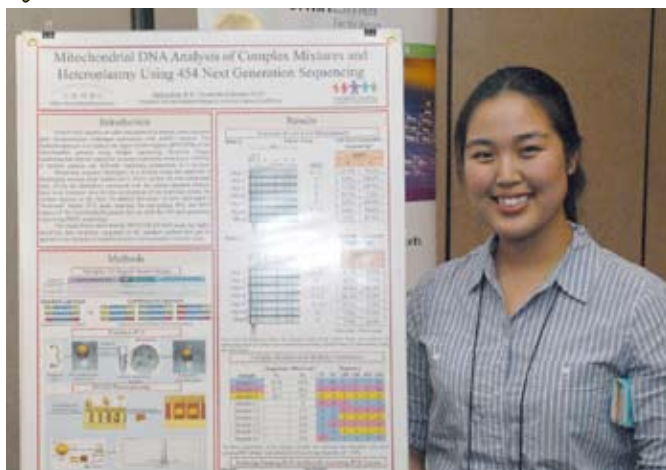
# Posters



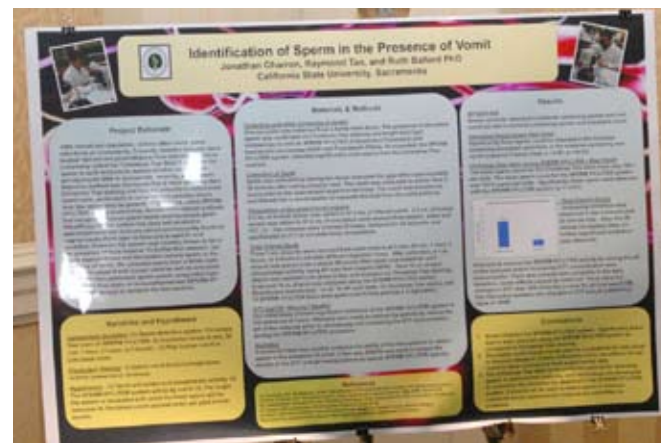
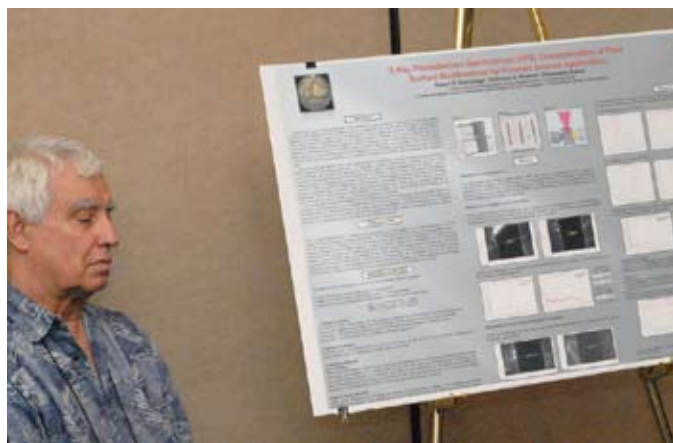
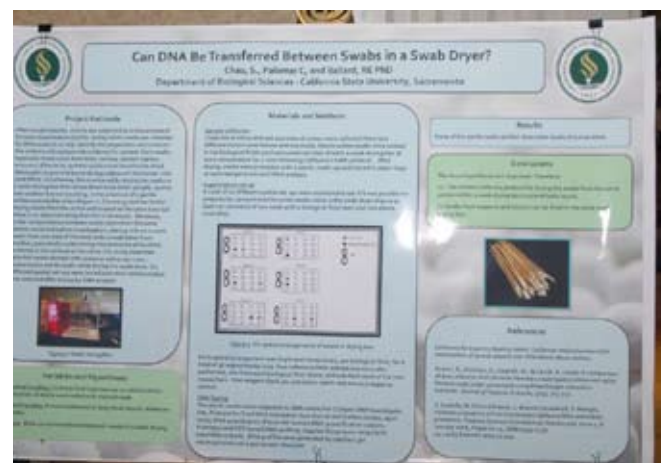
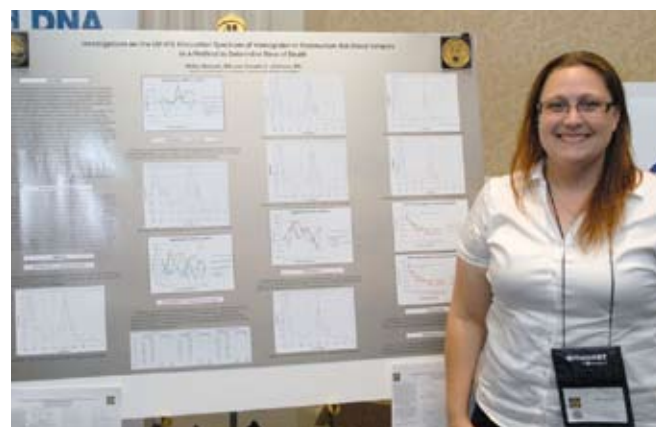
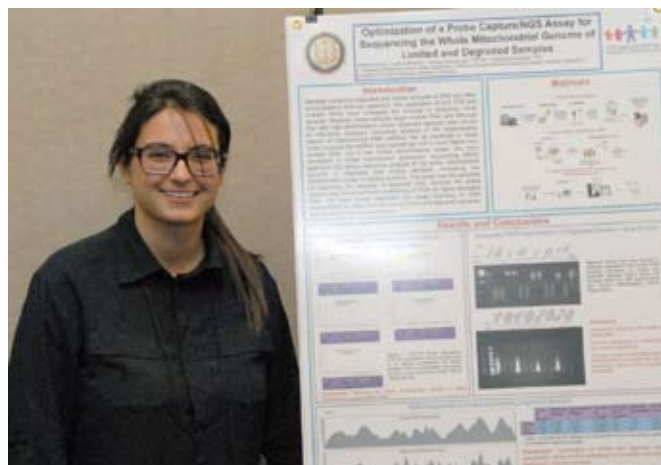
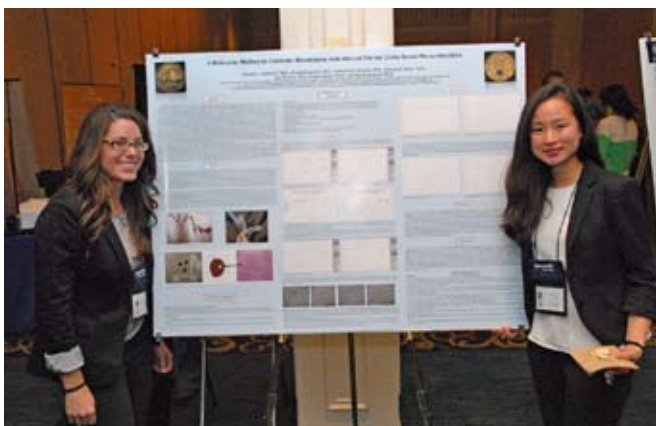
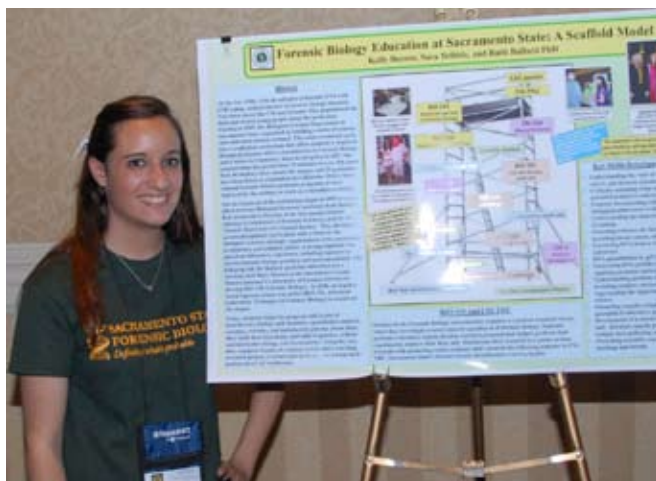
Above: A CAC timeline produced by the Historical Committee: Meiling Cabral (chair), Alex Taflya, John Babicka, Angela Meyers and Sabine Eichmann. (top) Leonie Elie (l) and Mark Baron (r) explain their research during the poster session.



# Posters







## NIST's "Biological Evidence Preservation" Now Available

Type of Evidence <sup>2</sup>	Frozen	Refrigerated	Temperature Controlled	Room Temperature
Liquid Blood <sup>3</sup>	Never	Best	Less than 24 hours	
Urine	Best	Less than 24 hours		
Dry Biological Stained Item <sup>4</sup>			Best	Acceptable
Wet Bloody Items (if cannot be dried)	Best	Acceptable	Less than 24 hours	
Bones	Acceptable		Acceptable	Acceptable
Hair			Best	Acceptable
Swabs with Biological Material		Best (wet)	Best (dried)	
Vaginal Smears			Best	
Feces	Best			
Buccal Swabs			Best	Less than 24 hours

Type of Evidence <sup>2</sup>	Frozen	Refrigerated	Temperature Controlled	Room Temperature
Liquid Blood	Never	Best		
Urine	Best			
Dry Biological Stained Items			Best	
Bones			Best	
Hair			Best	Acceptable
Swabs with Biological Material			Best (dried)	
Vaginal Smears			Best	
Feces	Best			
Buccal Swabs			Best	
DNA Extracts	Best (liquid)	Acceptable (liquid)	Acceptable (dried)	

Go to  
[www.nist.gov/oles/guide\\_043013.cfm](http://www.nist.gov/oles/guide_043013.cfm)  
 and download the full document.







# MODESTO

It's not that far.

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# Obituaries

## George G. Ishii, 1928-2013

### First Director of the Seattle Crime Lab

George G. Ishii, the first director of the Seattle Crime Laboratory, passed away quietly at home on the night of March 16, 2013, after a brief struggle with stomach cancer. He was 84.

A Seattle native, George was a graduate of O'Dea High School and Seattle University (1950). He worked for the Seattle Gas Company, Laucks Testing Laboratories, and the King County Coroner's Office before becoming the director of the Seattle Police Department Crime Laboratory in 1964. In 1975, the Seattle Police Department Crime Laboratory, the WSP Drug Control Laboratory, and the King County Sheriff's Office Crime Laboratory were consolidated. Two state laboratories, in Seattle and Spokane, were established and George was appointed director of the Seattle facility (then known as the Western Washington State Crime Laboratory).

George was a tireless advocate of the scientific method, ethics, and excellence in forensic science. He was one of the strongest advocates of accreditation and served as Chairman of the ASCLD committee (now known as ASCLD/LAB) that implemented a program of accreditation in the U.S. The Washington State Laboratory system was the third to be accredited by ASCLD (after Illinois and Arizona) in 1982. (Eight laboratories were accredited in the Illinois system and three in Arizona, hence the number "12" on the Seattle Laboratory certificate). In addition to being very active in ASCLD, George was also a fellow of AAFS, a charter Member of the NWAFFS, and a member of the American Chemical Society.

More than anything else, George instilled in his scientists the importance of a thorough and completely unbiased forensic examination grounded in sound scientific principles. Because of his excellent leadership and interpersonal skills, those whom George mentored had a very strong sense of personal ownership in the Seattle Laboratory.

George was one of the original practitioners of the now well-established school of "Management by Walking Around." He could frequently be seen walking around the laboratory asking each scientist what he or she was working on. Often, a discussion ensued, but George was not really testing each scientist's level of knowledge. He was actually having each scientist re-think all of the premises upon which the examination was being conducted, so that they might not only crystallize their thinking of the problem at hand, but more importantly, might also consider alternative approaches, hypothesizes, or means to attack the problem. In short, George was being the highly respected and inspirational mentor that many of us remember; a true charismatic leader and devoted friend of forensic science.

—Edward M. Suzuki

## Arne Bergh, 1928-2013

### Longtime Ventura Sheriff's Lab Director

Dr. Arne K. Bergh passed away April 7, 2013, in Chandler, Ariz. He was born on December 23, 1928, in Smithers, B.C., Canada, to Steiner and Anna Berg.

He is survived by Elizabeth, his wife of 59 years; his three daughters, Valerie McEwen of Tisdale, Sask, Canada; Cyndy Hammer of Tempe, Ariz.; and Wendy Locquiao of Moorpark, Calif.; his seven grandchildren are Megan, Kirstin and Ben McEwen of Saskatchewan, Canada; Gretchen and Philip Hammer of Tempe, Ariz.; and Lindsey and Erik Locquiao of Moorpark, Calif.; great-grandson, Grayson of Tempe, Ariz.

In 1949, he joined the Royal Canadian Mounted Police and upon his retirement in 1974, he was Scientific Officer of the R.C.M.P. Crime Labs. He earned a PhD in two disciplines. He also became an expert marksman earning Canada's Connaught Cup. He then taught forensics at Indiana University in Bloomington, Ind., for some years until he joined the Ventura County Sheriff's Department as the Director of the Crime Lab from 1980-1992. He and Elizabeth then retired to Chandler, Ariz. Proud, dignified and forever a gentleman.

*Adapted from [www.rcmpveteransvancouver.com/apr-27-to-may-3-gone-but-not-forgotten/](http://www.rcmpveteransvancouver.com/apr-27-to-may-3-gone-but-not-forgotten/)*



### A.K. Bergh Remembered

*When I heard about Dr. Bergh's passing, I found this photo in my archives: A very young John Houde in 1985 processing a Simi Valley clan lab with VCSO Crime Lab Director Arne Bergh (r). Now here was a boss who wasn't afraid to get down and dirty in the field... literally. At least we are wearing gloves!*

—J.H.





# Ethical Dilemmas

DISCUSSION CORNER WITH CAROLYN GANNETT

## Technically Correct Statements

**Make technically correct statements or else you are unethical—period.**

### THE SCENARIO:

Suzy did a crime scene reconstruction. She reported and testified to an event sequence: first A, then B, and then C. She was fully trained, had passed competency and all routine proficiency tests, and believed her conclusion was supported by the data, as did her technical reviewer. A cell phone video was later unearthed, which clearly showed that Suzy's event sequence was wrong.

Putting aside all other concerns and appropriate responses, did Suzy do anything unethical by testifying as she did?

### DISCUSSION

It may be intuitive to think that even forensic scientists are human and can make mistakes. Suzy was trained, passed competency and proficiency tests, and believed that her conclusions were supported. But they weren't—she made an innocent mistake. How can that be unethical?

Well, some ethics documents are black-and-white on the issue of technically correct statements. Seven of 37 forensic science ethics documents reviewed assert, in short: be technically correct or be unethical. No ifs, ands, or buts. No wiggle room for human error. Such documents may reflect that the potentially severe repercussions of mistakes made by forensic scientists demand holding practitioners to a higher standard—one that does not allow for mistakes. Make technically correct statements or else you are unethical—period.

Quotes taken from such documents are shown below (acronyms are explained below).

ASQDE IX.h: To make technically correct....statements in all written or oral reports, testimony, public addresses or publications....

IABPA 2, par. 3 & 2.1.1: A member shall make only technically correct statements.

MAAFS 1.3.5: Members should issue technically correct statements in all written or oral reports, testimony and public addresses.

NEAFS III.5 and NJAFS XVII.12: The forensic scientist should issue technically correct statements in all written or oral reports; [sic] testimony and public addresses.

RMABPA 1: Rendering technically correct statements in all written or oral reports, testimony, public addresses and publications.

Additionally, the ethics document that applies to members of ASCLD states:

ASCLD C 2.6: No member of ASCLD shall offer opinions or conclusions in testimony, which...are not supported by scientific data.

But such content is found only in less than a fifth of the ethics documents reviewed. Most ethics documents speak to the causes of technically incorrect statements, rather than directly speaking to the correctness of statements. As long as one practices within the confines of these documents, making technically incorrect statements is not considered unethical. These causes have to do with being competent, practicing only within one's area of expertise, and serving justice. In particular:

- Keep abreast of new developments; found in 22 documents, including CAC's and ASCLD/LAB's.
- Improve your knowledge, skills, and abilities; found in thirteen documents, including CAC's.
- Do not extend yourself beyond your area of expertise (your own limitations); found in 22 documents, including CAC's and ASCLD/LAB's.
- Recognize your own limitations; found in twelve documents, including CAC's and ASCLD/LAB's.
- Serve justice; found in nine documents, including CAC's.

When an individual is accused of making a technically incorrect statement, those few documents that deem this unethical may make investigations easier to handle. In order to determine whether there was an ethical transgression, the investigation need only determine whether a technically incorrect statement was made. There is no need to determine the reason. In particular, there is no need to determine whether the accused was being intentionally misleading—something that may be impossible. Such ethics documents may be more successful at curtailing the "liar for hire."

This is different from the majority of documents—those that do not deem technically incorrect statements as unethical. These documents complicate the investigation and enforcement of accusations of technically incorrect statements. The reason for an incorrect statement (incompetence, practicing outside one's area of expertise, or not serving justice) must be determined before it can be deemed unethical. This determination can be difficult and sometimes impossible. While such documents leave room for innocent human error, they also may provide enough room for intentionally misleading statements to be made with impunity.

Each type of document has its benefits and downfalls. What is important is realizing the difference and knowing what is said in the documents to which you and your colleagues answer.

*please turn to page 33*

*Share your thoughts & dilemmas at  
[www.ethicsforum.cacnews.org](http://www.ethicsforum.cacnews.org)*



## Can We Talk?



"Oh, puh-leeze..."

The middle of May finds us at the CAC meeting in Pasadena, ably hosted by the faculty and staff of the Cal State L.A. Criminalistics program. We are there to present a workshop on DNA interpretation, and we take advantage of the evening to sample the fine dining around the conference venue in the land of Roses and Parades. Open Table suggests Café 140, and so we set up shop at a quiet side table to unwind and discuss the latest topics in forensic science.

One of us (KPI) recently had the pleasure of addressing an audience in another state on a variety of topics. The participants and speakers comprised both forensic science colleagues and representatives of the legal system. At the end of the session, he suggested the following:

If the police arrest the correct person 95-97% of the time, then one of the valuable functions that science and our crime labs can provide is to assist in identifying those 3 – 5% of the cases where the investigation has led to the wrong person being identified as the perpetrator.

Now, truth be told, what was expressed at the conference was not nearly as refined as what is written above, but the tenor of the comment stimulated significant pushback; most in the audience understood the sentiment, but were not willing to accept the concept as a role they wished to play.

One commenter, a district attorney, phrased his opposition this way:

We all serve one master, and that is *justice*.

Our first reaction is that serving justice and identifying the wrongfully accused are convergent rather than opposing goals. But the comment by the DA also sparks a related question for us. Forensic scientists, we submit, are actually claimed by two masters: *justice* and *science*. Which one do we serve? The publishers of *Science and Justice*, at least, would seem to acknowledge, even embrace, this dual allegiance. But how do we cope with it in a practical fashion?

We submit that this is of everyday concern to all practitioners, inasmuch as we face a variety of conflicts between the needs and requirements of law and the practice of sound science. Examples of such conflicts that come immediately to mind include:

The use of techniques that might be well-established in science but are not admissible in court.

The spirit of openness and transparency in academic science and the requirement for strict oversight of information flow in law.

Confidentiality constraints that impede the direct exchange of information both between scientists and from scientists to the arbiters of justice.

The use of the judiciary to determine the efficacy, and hence admissibility, of particular scientific techniques, as opposed to scientific peer review as the ultimate and final arbiter of the value of said techniques.

The desire of lawyers to hear scientific conclusions in absolutes, rather than as probabilistic or limited statements.

Balancing the need for detail and clarity (writing for your colleagues) with brevity and simplicity (writing for the legal consumer) in both written reports and testimony.

Requests (or more forceful measures) by attorneys to influence or alter testimony or reports, either by edits or omissions.

Further, it is not immediately clear that the application of science to legal matters carries with it the service of justice. For instance, the CAC Code of Ethics includes this phrase:



It (criminalistics) involves the application of principles, techniques, and methods of the physical sciences, and has, as its *primary objective, a determination of physical facts which may be significant in legal cases* (emphasis added).

One might choose to interpret that phrase as leading to justice, but if it does, then it is merely an outcome of the primary objective of determining physical facts. In other words, it's not obvious that merely determining physical facts is serving justice. If, for example, those physical facts are based on evidence illegally obtained, then those facts may not be introduced to the triers of fact.

When a conflict arises, how do we choose our allegiance? Or is this a distinction without meaning? Talk to us! We invite your responses to this dilemma. We suggest that anecdotes are useful only insofar as they assist in supporting your thesis. However, we encourage you to discuss your thoughts with your colleagues over lunch!

We promise to collate and curate answers in the next *CACNews*, and request that you submit your thoughts by Aug 1, as we will need some time before the next deadline to prepare the material. Please submit your comments to Keith at [keith.inman@csueastbay.edu] and use "CAC Justice and Science" in the subject line.

Let the discourse commence!



## CAC Regional Director Reports

### South: Mey Tann

CA DOJ Riverside Laboratory hosted the last study group meeting on March 12, 2013 at the Corona Police Department Training Center. I coordinated the study group meetings:

CA Deputy Attorney General Mike Chamberlain spoke on the legal consequences of changed expert opinions after trial, as well as updates on other legal issues of interest to forensic scientists. Approximately 76 people in attendance. Study groups that met: Arson & Trace (joint), DNA, Quality Assurance, Blood Alcohol, CSI, Confirmed new Study Group Chairs for CSI, Mandel Medina Los Angeles Police Department Laboratory (323) 415-8142 N3141@lapd.lacity.org and Kristin Honig, M.S. Los Angeles Police Department Laboratory (323) 415-8843 N4670@lapd.lacity.org

Jennifer Rattanaprasit, the Blood Alcohol Study Group Chair no longer works for San Bernardino Co. Sheriff's Dept. SID. She is now with Las Vegas Metropolitan Police Department but she'd like to stay on as the Study Group Chair for Blood Alcohol.

### North: Alice Neumann Hilker

A study group meeting was held February 26, 2013 at the Santa Clara County Crime Laboratory in San Jose, CA. Cassandra Musgrave-Nelson and the Santa Clara County Crime Lab (SCCCL) organized the rooms, lunch speaker, meals, and directions.

Cordelia Willis of the SCCCL's Computer Forensics Unit spoke during lunch about the role of computer forensics in criminal investigations and demonstrated how videos and pictures are recovered from computers and cellphones. There were 45 lunch attendees.

The following study groups met: QA (21 attendees), Drug (16 attendees), DNA Technical Leaders (16 attendees), and DNA (31 attendees).

The Toxicology and Alcohol, Firearms, and Trace/Arson study groups did not meet during this period.

Megan Caulder of the Richmond DOJ was introduced as the new DNA Study Group Chair and successfully led her first study group. Stephanie Williams of the Contra Costa County Crime Lab announced her resignation as the QA chair. She was a very active participant and contributed a lot to the study groups and she will be missed. Mignon Dunbar of the San Francisco PD Crime Lab will replace her as the QA Chair. Additionally, Eleanor Salmon of the San Francisco PD Crime Lab will be the new DNA Technical Leaders Study Group chairperson.

On April 17, the DNA Technical Leader group had a "field trip" led by Bill Hudlow of the California Department of Justice, who allowed the group to experience the RapidHIT 200 rapid DNA instrument by IntegenX. Those in attendance participated in setting up the instrument, running their own buccal swabs on it, and reviewing the data after the 90 minute run time.

A study group will also be held on May 16, 2013 at the California Department of Justice Jan Bashinski Laboratory in Richmond, California. Megan Caulder, Meghan Mannion-Gray, and Eric Halsing have helped organize the rooms, lunch, and lunch speaker.

The lunch speaker will be Brian Ford from the United Kingdom speaking on a novel mechanism for spontaneous human combustion and the DNA Technical Leaders speaker will be John Buckleton of New Zealand speaking about statistics in DNA mixtures. Study groups that plan on meeting are the Trace/Arson group, the Quality Assurance group, the DNA group, the DNA Technical Leader group, and there may be a second DNA Technical leader "study group" field trip with another rapid DNA instrument at this study group as well.



The proposed meeting was held and the speaker, Brian Ford (3rd from left) poses with Meghan Mannion-Gray, Alice Hilker, John DeHaan, Michelle and Eric Halsing. —Ed.

# ABSTRACTS

FROM THE  
121ST SEMI-ANNUAL CAC SEMINAR  
PASADENA, CA  
MAY, 2013

## **Bloodstain Pattern Analysis on Fabrics**

*Mark Reynolds, Ph.D.*

The interpretation of bloodstains and bloodstain patterns observed on fabrics can be of critical importance in assessing a person's account or developing independent hypotheses on how blood came to be deposited on items of clothing. Whilst items of blood-stained clothing represent one of the most common forms of evidence submitted to the laboratory examiner, the influence of fabric type, treatment and/or history on the visual presentation and physical characteristics of bloodstains and bloodstain patterns constitutes some of the most complicated, yet least researched areas of BPA. The historical presentation of bloodstains and bloodstain patterns, ergo those seen by the laboratory examiner, can often bear little resemblance to those bloodstains and bloodstain patterns present soon after their deposition. Fibre type, fabric construction, moisture regain rate, treatments such as waterproofing, garment wear and/or cleaning history, fibre absorption and/or adsorption characteristics and scene interaction context all govern and influence the characteristics of the bloodstains and bloodstain patterns observed by the laboratory examiner. This presentation will discuss the factors, as mentioned above, that laboratory examiners who routinely assess and select bloodstains for DNA analysis and/or undertake BPA on blood stained items of clothing should consider when developing conclusions regarding the bloodstains and bloodstain patterns observed.

## **Development Criteria for a Next Generation Y- STR Multiplex for Forensic Applications**

*Christina A. Bormann Chung, Kelly Fenesan, Andrea Carbonaro, Julio Mulero, Human Identification, Life Technologies, Foster City, CA*

Y-STRs have been used in human identification for over a decade in paternity testing, male lineage studies, and forensic DNA analysis. Y-STRs offer certain advantages over autosomal STR analysis such as determining the number of male contributors in a sample, multigenerational male lineage studies and the ability to obtain a male profile in the presence of a high background of female DNA bypassing the need for performing differential extraction of sperm and epithelial cells. Y-STRs can be used for rapid exclusion of suspects. However, the discrimination power of Y-STRs is lower than autosomal STRs and non-exclusion cases may need further investigation. In recent years, population data for several new Y-STR loci have become available in the published literature. Some of these Y-STR loci are highly discriminating and thus offer good potential for use in forensic DNA analysis. Selection of the Y-STR loci for constructing a multiplex is critical and determines its downstream applications. If the objective

is to exclude close patrilineal relatives of the suspect then markers with a high mutation rate are preferred. On the other hand, in kinship analysis markers with high mutation rates might prove problematic. In designing a new forensic Y-STR multiplex the inclusion of currently used Y-STRs should be considered given that the existing Y-STR databases are already populated with profiles containing this information. New markers could be added to enhance the capabilities of already existing Y-STR multiplexes. These enhancements could combine features such as mini-STRs, the inclusion of highly discriminating markers which could allow for better differentiation of paternal lineages in populations with low Y-chromosome diversity and rapidly mutating markers. In addition, a next generation kit should also provide improved performance for profiling of challenging samples when compared to already existing multiplexes. These enhancements include improvements to the overall amplification balance, improved resistance to inhibitors of the PCR and shorter amplification times.

This presentation will discuss a strategy for the development of an enhanced Y-STR multiplex that combines well-known loci as well as recently characterized, highly discriminating Y-STRs into a single amplification reaction. Our results show that full profiles are attainable with low levels of male DNA (below 150 pg). Additionally, we demonstrate the ability to detect male specific profiles in admixed male and female samples at ratios greater than 1:1000.

## **Development of an Innovative DNA Quantification and Assessment System**

*A. Holt, R. Green, J. Mulero, J. Shewale, J. Muehling, J. Benfield, S. Olson, K. Fenesan, Human Identification, Life Technologies, Foster City, CA*

Recently introduced STR kits are highly sensitive, robust and discriminating thereby generating useful STR profiles from challenging samples. Such samples often have low quantity and/or poor quality of DNA, may contain PCR inhibitors, and, in sexual assault samples, a high quantity of female DNA compared to male DNA. These factors can make it difficult to make a decision whether to continue with STR analysis, which STR kit to use and how much DNA to add to the STR amplification reaction for obtaining a useful profile in first attempt. Thus, there is a need for a highly sensitive, robust, and faster method for the assessment of DNA extracts that provides consistent results. We describe a new DNA quantification and assessment kit to provide better correlation between the DNA sample and resulting STR profile. This next generation DNA quantification and assessment kit has high sensitivity (sub-pg level), for both the human and male targets, higher inhibitor tolerance to match next generation STR kits and additional critical tools for the determination of DNA quality. The time required to set up the assay and perform amplification has been significantly reduced compared to previous Quantifiler® kits. Further, the standard curve generation protocol is optimized to provide consistent results. We have successfully used this system as a decision making tool to obtain complete STR profiles from challenging samples. These samples include trace DNA samples, highly degraded DNA samples, low quantity of male DNA in high level of female DNA as well as samples contaminated with PCR inhibitors. Data demonstrating how this new quantification and assessment kit provides valuable sample quantity and quality in-



formation for making critical decisions in the STR workflow will be presented, illustrating how this approach can facilitate enhanced efficiency and first pass success rates.

## **PowerPlex® Fusion: An Expanded Multiplex for New Global Standards**

*Sara Laber, Promega Corporation*

As DNA databases continue to grow and international cooperation increases, the need for a common set of markers is required to facilitate data sharing and to reduce adventitious matches. Promega's PowerPlex® Fusion System provides all of the materials needed for co-amplification and five-color fluorescent detection of 24 loci (23 STR loci and Amelogenin), including the CODIS core loci and the European Standard Set (ESS) loci. The PowerPlex® Fusion System will enable increased discriminatory power and data sharing possibilities by means of the incorporation of common and informative loci used throughout the world. In addition, the PowerPlex® Fusion System builds upon recent advances in Promega STR chemistries, including improved inhibitor resistance, faster cycling time, and direct amplification from a variety of common sample types, resulting in more meaningful analyses for both casework and databasing efforts.

## **Analysis of mtDNA Mixtures Using 454 Sequencing**

*Cassandra Calloway, Ph.D.*

Next-generation sequencing (NGS) technologies are currently being explored for forensic applications and have the potential to greatly advance the field of forensics. These methods can be used for analysis of mixtures often encountered in forensic cases as the massively parallel, clonal sequencing aspects of these NGS technologies allows for unambiguous allele resolution and sensitive, quantitative detection of variants in a mixture. Probe capture methods have been used successfully for analysis of highly degraded 'ancient' DNA and could be applied to analysis of degraded DNA encountered in forensic cases. Moreover, these NGS methods have the potential to overcome many limitations of current technologies used for forensic analysis, particularly mtDNA applications.

We have developed a duplex PCR assay using 454 fusion primers for deep sequencing the mitochondrial DNA hypervariable regions I and II (HVI/HVII) and a probe capture assay for enrichment and sequencing the entire mitochondrial genome using the 454 NGS technology. We have successfully demonstrated that these highly sensitivity NGS mtDNA assays can be used for analysis of mixtures and limited DNA samples often encountered in forensic cases and results will be presented here.

Calculating Likelihood Ratios Incorporating a Probability of Drop-out: Theory and Practice

Norah Rudin, Ph.D., Keith Inman M.Crim, Kirk Lohmueller, Ph.D.

- Approaches to Assessing the Weight of Challenging DNA Samples
- Empirical Determination of Analytical Threshold (AT) and Probability of drop-out P(DO)
- Brief Comparison of Various Tools to Implement a Probabilistic Approach to Assessing the Weight of Evidence
- Introduction to Lab Retriever – A free and User-friendly Software Program to Calculate Likelihood Ratios with P(DO)

## **Artists' Paints in Focus**

*Alan Phenix, Getty Conservation Institute, Los Angeles*

Many of the methods used in forensic science for examination and analysis of objects and samples also find use in the cultural heritage sector for the study of painted works of art, to support understanding of artists' techniques and materials, and to investigate deterioration or alteration phenomena that have a bearing on conservation and/or restoration of the paintings. While a variety of non-invasive methods of examination and chemical analysis (including infrared, ultraviolet and X-ray imaging; X-ray fluorescence) are routinely used in the technical study of works of art, analysis of tiny samples of paint typically remains the main approach used in such investigations. Paint binder identification is usually achieved by combinations of instrumental analytical methods, usually FTIR microscopy, GC-MS, py-GC-MS, plus other techniques such as ELISA (enzyme-linked immunosorbent assay).

However, samples prepared, examined and analyzed as cross-sections are often central to technical studies of paintings, since both layer structure and pigment composition can be visualized by optical and electron microscopy. Alan will illustrate the application of microscopical examination of paint cross-sections in the technical study of works of art using examples from a variety of different projects undertaken at the Getty over the past few years. This survey will cover over three thousand years of paint: from the wall paintings in the tomb of Egyptian pharaoh Tutankhamen, to European medieval and Renaissance devotional works and altarpieces, through to the American abstract painters of the mid-late 20th century, like Jackson Pollock and Clyfford Still. Issues such as the constraints on sampling and on the interpretation of analytical findings will be considered in passing in relation to particular objects under study.

## **The Analysis of Metameric Blue Fibers and Their Forensic Significance**

*Dr. Paul Martin, CRAIC Technologies*

Metamerism is a phenomenon where two or more colored items with different chemistries appear to be the same color. However, those differences should result in different UV-visible spectra and the literature on color science states that metameric samples will have spectra that intersect at three or more loci. Metameric samples of blue textile fibers, which were created using different coloring agents or different relative concentrations of the coloring agents, were studied to demonstrate that they could be differentiated by obtaining their spectra using UV-visible microspectrophotometry. However, while some of the metameric samples tested did intersect at three or more loci, others did not intersect at all. In the spectra that did intersect, no correlation was found between either the dye chemistries or the relative component concentrations.

## **The Analysis of Fuel Markers by Surface Enhanced Raman Spectroscopy (SERS)**

*Mark Baron, Kelly Whittingham, Nick Meakin, Tim Wilkinson, University of Lincoln, UK*

Markers are added to subsidised fuels by governments to detect illegal activity such as deliberate misuse and smuggling to other countries. Fuel marking is an international business and there are a number of markers used globally.

Historically, these have been solvent dyes that are fuel soluble and detectable by simple spectrophotometric techniques. One analytical challenge is the need to disperse the marker into a highly non-polar fuel but then extract into a more polar phase for analysis. Molecule design has provided molecules with high solvent solubility that can undergo chemical change for easier extraction into an aqueous phase for analysis. In this presentation strategies for marker phase transfer will be discussed with the aim of providing sensitive measurement in an aqueous phase. The detection technique is Surface Enhanced Raman Spectroscopy and we have demonstrated that parts per billion detection levels are possible. Analytical challenges when applied to real fuel samples will also be discussed.

### Orange County's First Familial DNA Hit

*Mary Hong, Orange County Crime Laboratory*

On July 10, 1978 the partially clothed body of Linda Saunders was found behind a restaurant in Santa Ana, California. She had a blunt force trauma injury to her head, was shot once in the chest, and had been sexually assaulted. Her male companion was shot once in the head but survived. He gave conflicting statements regarding the description of the assailant(s). A DNA profile was developed from the semen recovered from Saunders body and was submitted to CODIS in 1999. The case remained unsolved and was submitted to the CA DOJ DNA Laboratory in 2010 for familial searching. A familial search result identifying a suspect was obtained in July, 2012 and, following an investigation and confirmation through DNA testing, the case was closed by the Santa Ana Police Department in December, 2012. The forensic technology utilized over the 34 years since the crime occurred and the investigative resources expended by DOJ and the local police agency will be discussed.

### NIST Research, Guidelines, and Tools that Support Forensics Scientists

*John Paul Jones, NIST*

The National Institute of Standards and Technology (NIST) has developed a large number of reference documents, tools and physical standards that support the forensic science community. The Forensic Science Program (FSP) at the Law Enforcement Standards Office (OLEs) within NIST conducts and coordinates research and provides technical services to address the needs of the forensic science community. The FSP focuses on creating new material standards; initiating metrology research; evaluating technologies; and establishing expert working groups to facilitate knowledge exchange and identify best practices. These activities have been used to support forensic science disciplines such as: arson; digital and multimedia forensics; DNA; fingerprints; firearms and toolmarks; odontology; controlled and dangerous substances; toxicology and trace analysis.

Topics that will be covered during this lecture: • NIST/DOJ Collaboration on a National Commission on Forensic Science • Publications from the Expert Working Group on the Preservation of Biological Evidence • Federal collaborative efforts to update the NIJ Crime Scene Guide published in 2000 • Expert Working Group on Human Factors in Latent Print Analysis • Upcoming free forensic science workshops & webcasts sponsored by NIST • Upcoming forensic science publications

### The Hurricane Meets CSI: How Forensic Science Can Convict – and Exonerate – The Innocent

*Alexander Simpson, Legal Director, California Innocence Project*

Forensic science has had a profound impact on the criminal justice system since its inception, and as methods for analyzing crime scenes and forensic evidence grow more sophisticated, their use in courtrooms means that judges and juries increasingly rely upon expert testimony to render verdicts in criminal cases. The reliance upon expert testimony has led many legal analysts to acknowledge the "CSI Effect" – that tendency of juries to demand forensic evidence before they convict, even when the case does not involve forensic analysis, and elevating the standard of proof prosecutors must meet. But the "CSI Effect" also means jurors place more faith in the abilities of forensic sciences to solve crimes, and rely upon experts more heavily than even the experts actually intended.

This presentation will discuss the use of forensic science in a number of wrongful conviction cases in California and across the country. Forensic science has advanced dramatically in recent years, but its possibilities (and limitations) are often misunderstood and incorrectly applied by those working in the criminal justice system, including prosecutors, defense attorneys, and judges. The presentation will dissect a number of cases of wrongful conviction, paying close attention to how forensic science has been used or misused in these cases. Forensic evidence has led to the exoneration of hundreds of innocent individuals in the last three decades. It has also led to an unknown number of convictions of innocent individuals in that same time. This presentation will explore the way forensic evidence is handled in criminal cases, and how criminalists can ensure their analyses are correctly understood and applied by attorneys, juries, and judges.

### Forensic Science and National Policy

*Anna-Marie Mazza, Ph.D. Director of Science, Technology, and the Law at the National Academies, American Association for the Advancement of Science*

This past February, the US Department of Justice and National Institute of Standards and Technology announced the establishment of the National Commission on Forensic Science as part of a new federal initiative to strengthen and enhance the practice of forensic science. The Commission comes four years after the Congressionally-requested National Academy of Sciences report, Strengthening Forensic Science in the United States: A Path Forward, which found "that the forensic science system...has serious problems that can only be addressed by a national commitment to overall the current structure that supports the ... community..." Since release of the report, the needs of the forensic science community have received a great deal of attention from Congress, the White House, and the forensic science community.

### The Broccoli Field Murder

*Samantha Skotarczyk, DOJ Santa Barbara Laboratory*

Pedro Gonzalez's body was found in an open broccoli field in Nipomo, CA on February 15th, 2010. Autopsy findings revealed a through-and-through gunshot wound to the head; however, no bullets or casings were ever located and physical evidence was minimal. The investigation led detectives to suspect a top-ranking Guadalupe gang member who was



responsible for collecting drug taxes from local drug dealers. After screening items from the suspect, the crime scenes, and the alleged transport vehicle, only one sub-mm bloodstain had the potential to link the suspect to the crime. This case presentation will describe the crime, the evidence, laboratory results, and courtroom testimony in a high-profile case.

### **Validation Tests and Error Rate Calculations for the Congruent Matching Cells (CMC) Method Using Cartridge Cases Fired with Consecutively Manufactured Pistol Slides**

*John Song, Wei Chu, Mingsi Tong and Robert M. Thompson, NIST*

NIST has developed the NIST Ballistics Identification System (NBIS) based on 3D topography measurements on correlation cells. The Congruent Matching Cells (CMC) method is used for ballistics identifications using three identification parameters of the paired correlation cells including the cross correlation function maximum CCFmax, registration angle, and x-y registration position. The numerical identification criterion is suggested as  $C = 6$ , by which the correlated topography pair is considered as a Match. An error rate calculation procedure based on the CMC method is also proposed for the error rate report of ballistics identifications.

In order to test the CMC method and to verify the proposed numerical identification criterion, 40 cartridge cases fired from handguns with 10 consecutively manufactured pistol slides are measured by a 3D confocal microscope and correlated by the CMC method. The breech face topographies are divided into cell arrays (7 X 7 or 6 X 6) for correlation. There are a total of 780 correlations including 63 known- matchings (KM) and 717 known-non-matchings (KNM).

The initial test results show that the numbers of congruent matching cell pairs (CMCs) for all 63 matching topography pairs are distributed in a range of 9 to 29; while the numbers of CMCs for all 717 nonmatching topography pairs are distributed in a range of 0 to 3. More tests conducted at different correlation conditions also show significant separations between the KM and KNM distributions without any false positive or false negative identification. That represents the highest identification accuracy for the same set of cartridge cases that have been tested at NIST thus far. Based on the CMC method, the collective error rates for the 63 KM (false negative error rate E2) and 717 KNM (false positive error rate E1) are calculated. The individual error rates for the KM correlations with the minimum CMC = 9, and for the KNM correlations with the maximum CMC = 3 are also calculated.

Initial tests support both the proposed CMC method and the numerical identification criterion  $C = 6$  for ballistics identifications. The proposed CMC method suggests that an empirical Identification Criterion of at least 6 matching cell pairs be used for separating the matching and non-matching topographies. With this criterion there are no false positive or false negative identifications using the NIST proposed CMC method for ballistics identification for this set of cartridge cases. The identification accuracy can be further improved by optimization of the cell size and the thresholds of the identification parameters. The proposed numerical identification criterion ( $C = 6$ ) for the CMC method is based on the identification criterion for the Consecutively Matching Striae (CMS) method developed by Biasotti and Murdock, which has been widely accepted by firearm examination community for bullet signature identifications. The CMC method using the

same numerical identification criterion  $C = 6$  has expanded the CMS method from 2D bullet signature correlations to 3D casing signature correlations.

### **Initial Correlation Tests and Analysis for Cartridge Case Intensity Images using the Congruent Matching Cells (CMC) Method**

*Mingsi Tong, John Song, Wei Chu, Johannes Soons, and Robert Thompson, NIST*

The NIST Ballistics Identification System (NBIS) is developed based on 3D topography measurements on correlation cells. The NBIS aims to provide objective, high-accuracy and high-speed ballistics identifications. The National Ballistics Evidence Search Engine (NBSE) is proposed by NIST for ballistics evidence searches using the Congruent Matching Cells (CMC) method with system interoperability and error rate report. Feasibility of applying correlation cells for 3D topography correlation is successfully demonstrated by validation tests using 40 cartridge cases fired with 10 consecutively manufactured slides. The results show a significant separation between the known-matching (KM) and known-nonmatching (KNM) distribution. However, most existing ballistic identification systems are based on intensity image comparisons; and a huge number of intensity images are stored in the National ballistic database. It is necessary to conduct a validation test that demonstrates the feasibility of the CMC method for the identifications of optical intensity images.

A Leica comparison microscope is used to capture the breech face intensity images of the same set of 40 cartridge cases fired from handguns with 10 consecutively manufactured pistol slides. To confirm the equipment accuracy, repeatability and reproducibility tests are performed. In the correlation tests using CMC method, a total of 780 correlations including 63 KM and 717 KNM were implemented. The effects of different lighting conditions for the image correlations were also tested and analyzed. In the initial tests using the single correlation parameter of the whole optical image: the cross correlation function maximum CCFmax, the KM and KNM distributions cannot be separated. However, by using the CMC method with three identification parameters (the correlation function maximum CCFmax, the registration angle and registration position in x, y), the KM and KNM distributions show clear separations without any overlap. There is no false positive or false negative identification in all 780 correlations.

The results show that the CMC method works well for correlation of both the 3D topographies and optical intensity images. Significant improvement can be achieved by applying CMC method with three identification parameters on intensity image data compared with the correlation of whole image using a single correlation parameter CCFmax. The CMC method also shows a good robustness to lighting condition variance. Optimization of the cell numbers and the thresholds of the correlation parameters can further improve the identification accuracy. Certain commercial equipment, instruments, or materials are identified in this paper to specify adequately the experimental procedure. Such identification does not imply recommendation or endorsement by the National Institute of Standards and Technology, nor does it imply that the materials or equipment identified are necessarily the best available for the purpose.

## Using Digital Imaging Tools to Enhance Restored Serial Numbers

Greg Laskowski, Kern Co DA Forensic Sci Div (ret.)

Many valuable objects have serial numbers, so that should they become lost or stolen, then are later recovered, the manufacturer or owner can be identified. These numbers can be stamped etched, inscribed, or engraved. The processes used to restore removed or obliterated serial numbers are mainly by mechanical action followed by some form of chemical, electrochemical, magnetic, and by heat. In some cases, the restored serial numbers are clearly visible, while in many instances there are only partial numbers that can be visualized or the restored numbers are barely visible or legible. The introduction of digital imaging technology can assist the examiner in enhancing the visibility of restored serial numbers through a series of software tools available through such standalone photographic programs as Adobe Photoshop™ or an integrated program offered by Mideo Systems in their CASEWORKSeis™. This paper will discuss the use of the imaging tools available in CASEWORKSeis™ to enhance and record restored serial numbers in observed in casework.

## PANEL: The Role Of DNA in Prosecuting Nonstranger Sexual Assault: Perspectives From Research, The Forensic Science Laboratory, Law Enforcement, and the DA's Office

Carol Burke, Sex Crimes Head Deputy, Los Angeles County District Attorney's Office ; Dean Gialamas, Director, Los Angeles County Sheriff's Department, Scientific Services Bureau; Michel Moore, Assistant Chief, Los Angeles Police Department; Joseph Peterson, PhD, Professor, California State University, Los Angeles Daniel J. Scott, Detective Sergeant, Los Angeles County Sheriff's Department, Special Victims Bureau; Katharine Tellis, PhD, Assistant Professor, California State University Los Angeles

The purpose of this panel is to facilitate a dialogue between criminal justice researchers and practitioners to consider the evidentiary role of DNA in prosecuting nonstranger sexual assault from various perspectives. In the post-backlog era and often in response to pressure from victim advocates, many law enforcement agencies test every sexual assault evidence kit as a measure of commitment to public safety for all victims. However, the effectiveness of this approach must be examined amidst the context of increasingly limited state and local resources, along with the actual value gained from such expenditures in terms of increasing the successful prosecution of nonstranger sexual assault. Panelists will discuss the issues associated with testing all nonstranger sexual assault evidence kits, such as practical considerations regarding kit-testing priority based on caseload and suspect/victim relationship, and whether the salience of DNA in these cases is obviated by the consent defense.

## Detecting and Preventing Crime in Hospitals

Beatrice Crofts Yorker, Dean of the College of Health and Human Services, CSULA

Crimes committed in the context of healthcare have been documented for centuries, however the advent of high tech and intensive care environments have created an alarming increase in both occurrence and the identification of criminal

acts in hospitals. There have been over 90 healthcare providers prosecuted for serial murder of patients in their care since the 1970s. These cases are extremely complicated to prosecute as evidence ranges from post-mortem toxicology to statistical analysis to case review and eyewitness testimony. In addition to murder by healthcare providers, child abuse also occurs in hospital settings in the form of Munchausen Syndrome by Proxy and child sexual abuse.

The presenter has studied the prevalence of crime in hospitals since 1986 and she will provide data on prosecutions in 26 different countries around the world. She has testified in cases such as a mother who injected her child's intravenous line with fecal material to cause sepsis and apnea caused by suffocation. Other examples of criminal acts include a nurses' aide who was prosecuted for distributing child pornography after he took photos of developmentally delayed children with his cell phone in a pediatric hospital and the recent case of a physician in Brazil being investigated for hastening the deaths of up to 300 patients in order to "free up hospital beds". While these cases are shocking, there are ways to collect evidence such as covert or overt video surveillance, pharmacological tracers, and death review that can assist with prosecution and deter crime.

## Unusual Ways to Commit Suicide

Margaret A Kaleuati, County of Los Angeles Dept of Coroner

This presentation reviews multiple unusual cases of suicide including a gunshot wound to the top of the head with a downward and slightly back to front trajectory and the application of a chainsaw to the neck. It will also discuss the findings of each investigation including the initial death scene examination, autopsy results and subsequent analysis of trauma in the biological tissues. Only two suicides by chainsaw have occurred in Los Angeles County; suicide utilizing firearms is much more frequent. The presentation will review the mechanisms of suicide utilizing guns and chainsaws and compare them to other cases reported in the literature. Additionally, it will review the Los Angeles County Coroner's experience with suicidal gunshot wounds over the last 10 years to highlight how unusual a gunshot wound to the top of the head is for a suicide.

## Ethical Dilemmas Created by Employer Objectives and Pressures

Greg Matheson, Dir., LAPD Criminalistics Laboratory, (ret.)

The concept of criminalistics laboratories being totally independent of law enforcement and prosecution has been discussed for years. However, the publishing of the National Academy of Sciences report "Strengthening Forensic Science in the United States: A Path Forward" has prompted national level discussion of the concept. Recommendation #4 of the report states - "To improve the scientific basis of forensic science examinations and to maximize independence from or autonomy within the law enforcement community, Congress should authorize and appropriate incentive funds to the National Institute of Forensic Science (NIFS) for allocation to state and local jurisdictions for the purpose of removing all public forensic laboratories and facilities from the administrative control of law enforcement agencies or prosecutors' offices." Many reasons are given for the need for independence but of primary importance is the belief that moving crime labs out of law enforcement will reduce or eliminate biases and



pressures created by the close interrelationship between a scientific laboratory and law enforcement.

It is unlikely the majority of crime laboratories are going to be removed from law enforcement agencies in the foreseeable future so it is important to investigate and discuss the issues associated with the current organizational location of crime laboratories. It is my belief most criminalists will experience some type of pressure to amend their notes or report to better reflect and support the theory of how a criminal event occurred which is promoted by their employer. To test this belief, I requested CAC criminalists to provide me with their experiences of pressure to change their analytical conclusions from laboratory supervision and/or management, detectives, agency management, prosecuting attorneys or defense attorneys. In addition to many examples of pressure, I also received many comments as to how they handled the situation. Using these examples, along with my personal experiences and published information on the subject, this presentation will explore the types of real and/or perceived pressures analysts, supervisors and managers may face when working within a law enforcement agency. We will also discuss ways to mitigate potentially negative influence of the work environment on scientific work, and how having a strong understanding of ethics and participating in strengthening an ethical culture in the work place can minimize the issues and concerns.

### Fixing Criminalistics

*Gregory B. Matheson and Dr. Peter R. De Forest, Professor Emeritus of Criminalistics at the John Jay College of Criminal Justice, City University of New York*

“Criminalistics, properly practiced, is a challenging and a profoundly intellectual endeavor. Unfortunately, it is not always viewed this way by those who hold the title Criminalist. Compounding the problem further is the fact that some criminalists are constrained from practicing criminalistics the way it should be practiced.”

The foregoing quote is taken from the abstract for a presentation one of us made at the Fall 2006 CAC Meeting in Temecula. Well prior to the current session we would like you to read the full abstract and other reading materials that will be supplied to you electronically by Kathy Roberts in advance of the meeting. The readings detail impediments to criminalistics realizing its full potential. This presentation will focus on what can be done to remove the impediments and is intended to be primarily a discussion session facilitated by your two presenters. Each of us will make a short introductory presentation before initiating what we hope will be a lively, informed, and constructive discussion.

Please come prepared to discuss the issues and put forward recommendations. Funding has been a perennial problem. Criminalistics has been playing “catch-up” for decades as the demands have increased. In our discussions, let us focus on fundamental changes. Some of these may impact the economics of Criminalistics positively or negatively. With the CAC’s long history of leadership, hopefully, this discussion will contribute to positive changes in the field for the future.

### 2D/3D Topography Comparisons of Toolmarks Generated by Consecutively Manufactured Chisels and Punches

*Alan Zheng, Robert Thompson, John Villanova, NIST*

This study seeks to evaluate whether a mathematically objective metric, the maximum value (CCFmax) of the Cross Correlation Function, can be used to identify a tool that generated a striated or impression toolmark. The study addresses two types of tools: chisels for striated toolmarks and punches for impression toolmarks. Ten consecutively manufactured chisels and punches were obtained from Western Forge (a supplier of Craftsman™ Tools). We separated the study into striated toolmarks generated by the chisels and impressed toolmarks generated by the punches. For each of the ten ½” (12.7 mm) chisels, a set of two known toolmarks were created on a polished copper plate through a controlled dragging motion produced by a motorized jig. After the identities of the chisels were randomized and hidden, we created an additional set of 20 unknown toolmarks (two marks per chisel). For each toolmark, we used a 2D stylus probe instrument to measure the surface topography along a line orthogonal to the striations. A total of 1600 profile comparisons were performed in a 40 x 40 matrix. For each comparison, the two profiles were automatically registered to obtain the maximum value (CCFmax) of the Cross Correlation Function. The CCFmax values for the known match and known non-match comparisons were used to establish test statistics for the reliable identification of the unknown toolmarks based on CCFmax values. For each of the ten punches, two known toolmarks were created on a polished copper plate through a controlled drop of the punch, which was mounted on a linear rail. After the identities of the punches were randomized and hidden, a set of 20 unknown toolmarks (two marks per punch) were created. A disk scanning confocal microscope was used to measure the 3D topography of the toolmarks. The data were then trimmed to remove any uninformative areas. Before the comparisons, each measurement was automatically pre-processed. A total of 1600 surface comparisons were performed in a 40 x 40 matrix. For each comparison, the pre-processed data sets were automatically registered in position and orientation to obtain the maximum value (ACCFmax) of the Areal Cross Correlation Function. The known match and known non-match ACCFmax values were used to establish test statistics for the reliable identification of the unknown toolmarks based on ACCFmax values.

Based on the CCFmax metric, and a statistical analysis of the known match and known non-match scores, all of the unknown striated chisel toolmarks and impressed punch toolmarks were correctly identified back to the tool that created them.

In a blind study of ten consecutively manufactured chisels and punches, the maximum value (CCFmax) of the Cross Correlation Function was successfully applied to link the measured surface topography of a toolmark to the tool that created it. These results provide an objective mathematical validation of the science for both striated and impressed toolmark comparisons.

### The Role of the Medical Examiner–Coroner, Including Solving ‘Unsolved Homicides’—the Los Angeles Coroner Experience

*Dr. Lakshmanan Sathyavagiswaran MD, FRCP(C)FCAP,FACP, Chief Medical Examiner–Coroner/Interim Director, Department of Coroner, Clinical Professor USC Keck school and UCLA Geffen*

*school of Medicine Los Angeles County, California, USA*

#### Instructional Goals of Presentation:

(1) Coroner law mandate, including local practices for accepting Coroner cases in Los Angeles County. (2) Team approach in medico-legal death investigation. (3) Learn the benefits of autopsies in evaluating natural and unnatural deaths. (4) Attendees will understand the importance of consistently taking DNA specimens during medico legal death investigation and autopsy. (5) Attendees will understand the importance of following procedures as they relate to evidence collection/submission and maintenance of chain of custody. Coroner law mandate including local practices for accepting Coroner cases in Los Angeles County, interesting cases emphasizing teamwork, scene investigation, appropriate consultation in medico legal death investigation will be discussed. The investigation of various long-unsolved murders in Los Angeles County using modern forensic science techniques, especially recent advances in DNA, will be discussed. Case examples will be used to discuss the challenges involved, including verification of identification, retrieval of records and photos, authentication of physical and sexual assault evidence, chain of custody documentation, need for following procedures, and maintaining an archive of old procedure manuals including testing techniques/standards. The need to withhold information from family members in the interest of not jeopardizing an investigation is paramount.

Challenges in handling high profile cases including Trial techniques used by the Chief Medical Examiner- Coroner emphasizing interagency cooperation/scene visits to the scene of death so that environmental factors like location of plants, size of area possible confrontation, and location and position of bodies when found all could be evaluated will be discussed. This allowed for proper correlation in opining injury patterns observed on the decedents.

Challenges of intense media scrutiny due to high profile nature of the case will be discussed i.e. all requests were coordinated through the office of the Chief Medical Examiner-Coroner. This will include evaluation of evidence by experts, release of autopsy reports, photographs, all department manuals, and specimens to both prosecution and defense. There was also intense competition among media, with each of them competing to get the "scoop of the day" for the prime time news.

It should be noted that when a department has a highly publicized/televised case, key witnesses could be targets for personal attacks. During the "Simpson Trial", the Chief Medical Examiner-Coroner was always escorted to and from court by investigators from the DA's office. In conclusion, high profile cases must be handled with a great deal of thought and coordination with other agencies. Cases will be long discussed and debated and media will always try to focus on the medical examiner's handling and investigation of the case.

## Designer Drugs 201

*Nathan Lind, LA County Sheriff's Department, Controlled Substances Section*

Research chemicals, AKA synthetics, have been sweeping across the globe in recent years. Originally born for legitimate research ideals, these drugs have become the norm for individuals looking to achieve the perfect legal high. In many states and countries, these drugs have little to no restrictions yet show frightening consequences at different levels of abuse. The large percentage of abusers appear to be younger individ-

uals looking to extend long nights of partying, dancing and socializing without the repercussions of being in possession of a controlled substance. These synthetic drugs are first developed and tested in the European social scene as club drugs used to sustain long nights of raves and parties. After continued use, these drugs find their way to our shores, streets, bars, clubs and schools. They can be easily purchased from internet vendors, head shops or other nontraditional means of purchase, i.e. street chemists.

Identification of these designer drugs is often a difficult and daunting task. Much like technology of today, these drugs can change and reconfigure under the whim of any street chemist. Their goal is always to stay one step ahead of law enforcement's attempts to clamp down and regulate these synthetic substances. Given the ever changing appearance of these drugs, identification can become a difficult process to obtain reference samples needed to positively identify these dangerous substances. Synthetic drugs are designed to mimic naturally occurring or other known narcotic families. Synthetic cannabinoids (spice, K2) have been found to give effects similar to delta-9 tetrahydrocannabinol by interacting with the same body receptors that delta-9 THC bind with. The substituted cathinones (bath salts) have been found to be a cross between methamphetamine and/or cocaine use. However, these synthetic drugs have a more dangerous and sinister effects give the many observable adverse reactions that users face which include excited delirium and in some cases death. Much of these can be attributed to not just the designer drug abused but also from the fact that there is no quality control associated with the production and distribution of these chemicals.

## Microcrystalline Tests -Updating a Classic Technique

*Leonie Elie, Mathieu Elie, Dr Ruth Croxton, Dr Mark Baron, University of Lincoln, UK*

Microcrystalline tests are rapid, non-instrumental tests using the formation of specific crystals on a micro scale for identification of compounds when mixed with a chosen reagent. They have been used for decades aiding analysis of seized samples of suspected drugs of abuse. Due to the nature of the test, a definite yes or no answer is always provided when a test is carried out. In principle, an unknown powder sample is mixed with water and a small volume of this solution is applied to a microscope glass slide. A reagent is then added and microcrystal formation is observed using optical microscopy. Results are compared to microcrystals obtained with standards, which are carried out alongside. With the proliferation of novel psychoactive substances as legal high products on the internet and the subsequent attempts to control these, quick and conclusive tests for forensic drug analysis are required. The authors have recently published microcrystalline tests for three relatively novel substances, mephedrone, MDAI, and benzyplpiperazine; and research to find new tests for emerging substances is constantly on going. It was proven that microcrystalline identification is possible on legal high samples purchased over the internet, which are often mixtures of active ingredients and cutting agents such as caffeine and benzocaine. Furthermore, a novel method of performing microcrystalline tests with reagents integrated into capillary tubes will be presented. Results show that using capillary tubes instead of glass slides neither affects size and crystal shape nor habit and detectability but improves portability and minimizes cross-contamination. Additionally, a simple but effective meth-



od of preservation of microcrystals has been developed to aid long-term storage. Modern imaging technology was used to improve the quality of micrographs taken throughout the observations. Multiple images of different focal planes of samples were taken with a digital SLR camera mounted to a microscope. Images were combined using software-based stacking techniques, which greatly enhanced the depth of field allowing better interpretation of the micrographs obtained. The presented material provides an update on microcrystalline research and presents new developments on the technique that should assist Forensic Service providers in improving routine procedures of microcrystalline testing as well as aid with long-term storage and preparation of evidence.

### Microcrystalline Test-Raman Spectroscopy: A Novel Hypenating Approach for the Detection of Drugs of Abuse

Leonie Elie, Mathieu Elie, Dr. Gareth Cave, Dr. Ruth Croxton, and Dr. Mark Baron. University of Lincoln, UK

Microcrystalline tests (MT) are a powerful non-instrumental technique for the analysis of bulk samples of drugs of abuse. Despite being largely used as screening tests to gain preliminary results, they hold higher discriminating power than other screening techniques ultimately providing identification of active ingredients. The formation of microcrystals is a separation of molecules from the sample matrix. This was proven by analysing microcrystals by Raman micro-spectroscopy and comparing results to those obtained from standards. The crystal lattice cell unit was determined by X-ray diffraction confirming the presence of only drug and reagent and therefore making the microcrystals highly specific. Model mixtures of two commonly found cutting agents with novel psychoactive substances (NPS) were analysed using microcrystalline test – Raman spectroscopy (MT-RS) and spectra obtained from mixture crystals were similar to those of pure standards proving the separation of molecules by forming microcrystals. Additionally, microcrystalline tests are very powerful when used for the separation and identification of isomers. The differentiation between optical isomeric forms of amphetamines and methamphetamines is well published, and it indicates that results can be transferred to other isomeric forms. NPS are cleverly designed molecules, which often have multiple forms of regio-and/or stereoisomers. Legislation often specifies the region-and/or stereo-isomeric forms so there is a need for conclusive identification of the isomeric form present. Microcrystalline tests offer a solution with the development of different crystal habits depending on the molecular structure. In combination with a consecutive analysis by Raman spectroscopy, an identification and confirmation of a psychoactive substance can be achieved. Microcrystals formed between drugs of abuse and their corresponding reagents are the result of addition reactions where drug and reagent form a complex. The bond between drug and reagent molecules can be broken easily by adding solvent subsequently dissolving the crystals and releasing the drug molecules back into solution. Solvents in which the analyte has optimum solubility are the most appropriate to choose. MTs were coupled with GC and LC-MS creating simple offline methods to screen and separate, identify, confirm and quantify drug samples and legal high products. Therefore, microcrystalline tests are reversible and non-destructive in the sense that the analyte molecule can still be detected by other techniques even though the sample may be contaminated with reagents. The

recycling of samples could be of use where seized samples have been insufficient to carry out confirmation tests.

### The Pat Tillman Case

Michael Kelley, Chief Warrant Officer, US Army, CID (ret.)

Corporal Patrick Daniel "Pat" Tillman was an American Football Player who left his professional career to enlist in the United States Army in June 2002 in the aftermath of the September 11 hijacking of US commercial airliners and subsequent attacks. Pat Tillman joined the United States Army Rangers and served several combat tours in Iraq and Afghanistan before he was killed by friendly fire in the mountains of Afghanistan on April 22, 2004. In order for Pat Tillman to be awarded the Silver Star medal, the Army at first reported that Tillman had been killed by enemy fire, and Lieutenant General Stanley A. McChrystal approved the award of a Silver Star. As a result of the incorrect reporting of Pat Tillman's death, the Army launched a couple of investigations, the earliest of which fell short of true fact finding investigations. The Department of Defense ordered a final on-site investigation by Army Criminal Investigation Command (CID) special agents and forensic investigators in order to fully document the events surrounding Ranger Tillman's death and to assess the actual cause of death.

### Ethical Dilemmas cont'd from page 23

#### ACRONYMS

ASCLD C: American Society of Crime Laboratory Directors, Code of Ethics directed at members

ASCLD/LAB: American Society of Crime Laboratory Directors, Laboratory Accreditation Board

ASQDE: American Society of Questioned Document Examiners

CAC: California Association of Criminalists

IABPA: International Association of Bloodstain Pattern Analysts

MAAFS: Mid-Atlantic Association of Forensic Scientists

NEAFS: Northeast Association of Forensic Scientists

NJAFS: New Jersey Association of Forensic Scientists

RMABPA: Rocky Mountain Association of Bloodstain Pattern Analysts

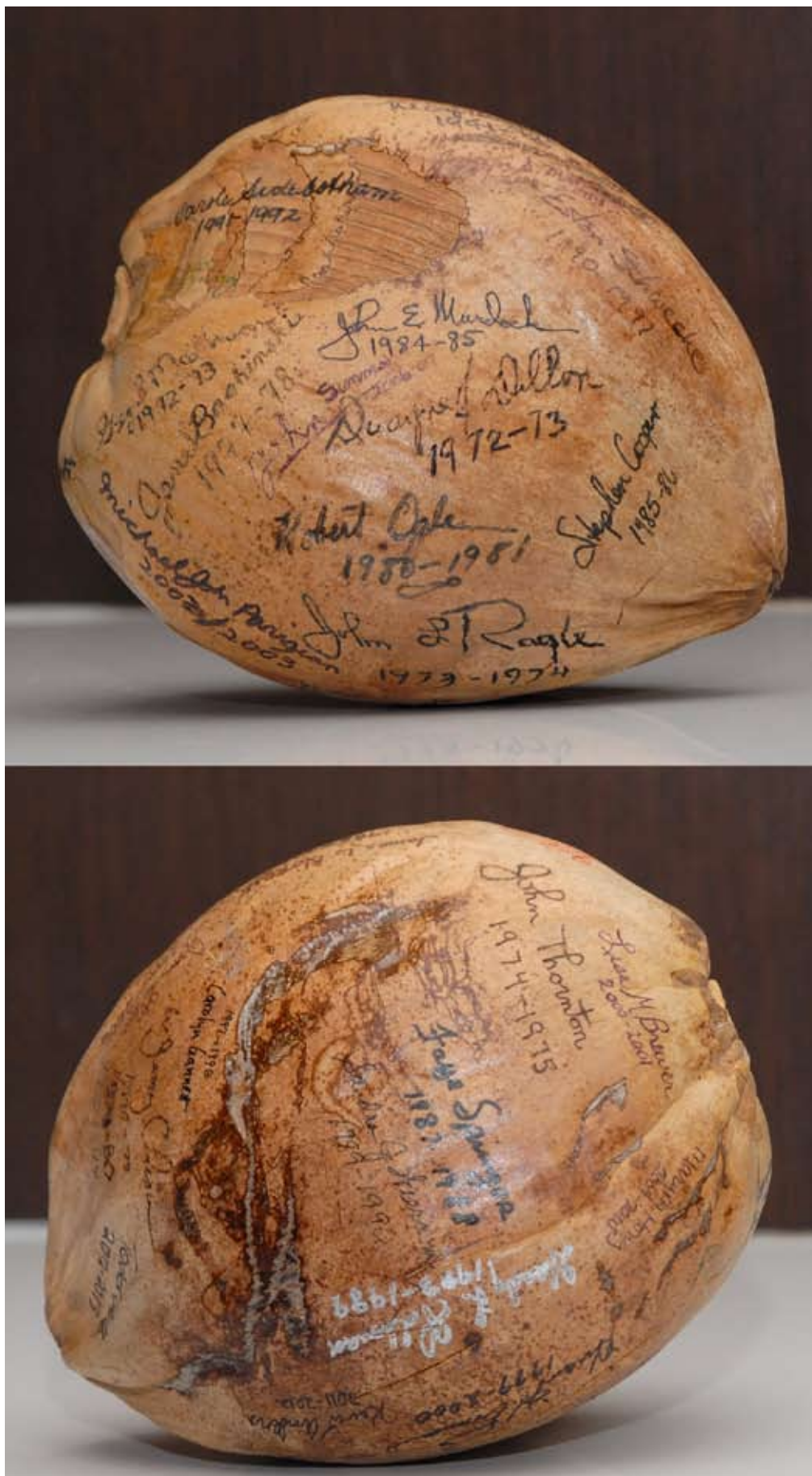
## The CAC Coconut, 2013

*To help keep the tradition alive, we reprint this item from the CACNews Spring, 1997.*

It is with sadness that the CAC learned on September 25, 1996 of the death of Herman Meuron. Older CAC members will remember Herman as a criminalist with the Alameda County Crime Lab, and before that as a chemist with the Food and Drug Administration, and the Alcohol, Tobacco Tax and Firearms Division of the IRS where he retired as chief chemist.

After his first retirement, Herman went to work for the Alameda Sheriffs Office and retired again in 1971. He moved to Hawaii, but returned from Hawaii on several occasions to attend CAC meetings. The first meeting he attended after his move to Hawaii in 1971 was the meeting at which Tony Longhetti assumed the office of CAC President. Herman announced at that meeting that he felt a special kinship with Tony and to commemorate his feelings he brought Tony a gift from Hawaii. That gift, a coconut, has become one of the venerable symbols of the office of the CAC president. It has been passed from Longhetti to Dillon to Ragle to Thornton to Davidson to Morton to Bashinski to Chisum to Ogle to Rhodes to Tulleners to DeHaan to Murdock to Cooper to Norris to Springer to Goldman to Wiersema to Schwecke to Sidebotham to Matheson to Chisum to Gibbons to Hunter to me. Every time I saw Herman he would comment about how much he thought he, Tony, the coconut, and I had in common. He leaves a legacy as a public servant, a fine scientist, a dedicated professional, and an irrepressible wit—and a coconut. Those of us who have passed along the coconut, and who will pass it a long in the future, could do no better.

—Pete Barnett





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CALIFORNIA ASSOCIATION OF CRIMINALISTS  
B O A R D O F D I R E C T O R S

President:  
**Eric Halsing**



CA DOJ Jan Bashinski Lab  
1001 W. Cutting Blvd, Ste 110  
Richmond, CA 94804  
(510) 620-3300  
president@cacnews.org

President-Elect:  
**Greg Laskowski**



8021 Dottie Court  
Bakersfield, CA 93308  
(661) 737-2961  
president-elect@cacnews.org

Recording Secretary:  
**Kirsten Fraser**



LASD Scientific Services Bureau  
1800 Paseo Rancho Castilla  
Los Angeles, CA 90032  
(323) 267-6152  
recordingsecretary@cacnews.org

Treasurer:  
**Meghan Mannion-Gray**



CA DOJ Jan Bashinski Lab  
1001 W. Cutting Blvd, Ste 110  
Richmond, CA 94804  
(510) 620-3300  
treasurer@cacnews.org

Regional Director: (North)  
**Alice Hilker**



San Mateo Co. Sheriff's Lab  
50 Tower Rd.  
San Mateo, CA 94402  
(650) 312-5540  
northregion@cacnews.org

Regional Director: (South)  
**Mey Tann**



CA DOJ Riverside  
7425 Mission Blvd.  
Riverside, CA 92509  
(951) 361-5000  
southregion@cacnews.org

Membership Secretary:  
**Michelle Halsing**



CA DOJ Jan Bashinski Lab  
1001 W. Cutting Blvd, Ste 110  
Richmond, CA 94804  
(510) 620-3300  
membership@cacnews.org

Editorial Secretary:  
**Gregory Matheson**



LAPD Crime Lab (Retired)  
FSLResources Inc.  
10736 Jefferson Blvd. #732  
Culver City, CA 90230  
editor@cacnews.org

Immediate Past President:  
**Todd Weller**



Oakland PD Crime Lab  
455 7th Street, Rm 608  
Oakland, CA 94607  
(510) 238-3386  
past-president@cacnews.org



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